DAIRY, PIGS AND POULTRY

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PREFACE.

THE present Volume, discussing the management of the Dairy, of Pigs, and of Poultry, is, like those volumes in the series which have preceded it, purely rudimentary. Presenting, therefore, outlines only of the subjects of which it treats, and these necessarily comparatively limited in character, the author nevertheless ventures to trust that its pages will convey to the tyro in Agriculture some useful information. Nor does he refrain from cherishing the hope that practical men, who may favour them with a perusal, may find not only a fair *résumé* of the points of the general subject embraced by them, but reference here and there to others which, though frequently overlooked, yet bearing very closely upon the success of daily practice, are nevertheless possessed of considerable importance.

In preparing the present Volume, the author has largely consulted numerous authorities, and has further freely availed himself of notes forming part of a series of papers on the subject, which he had the privilege to write for one of the leading agricultural journals.

In connection with the diseases of stock, the author has availed himself of the services of a skilful veterinary surgeon, who has prepared several notes, which form, indeed, the bulk of the matter contained in the chapters which embrace this important department.

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OUTLINES OF MODERN FARMING.

DIVISION FIRST—MANAGEMENT OF THE DAIRY.

CHAPTER I.

OF THE BREEDS OF DAIRY COWS.

In the Third Volume of the present series of "Rudimentary Treatises on Modern Farming," we have, in Chapter i., given a description of the various breeds of cattle comprised within this department of farm-stock. We now detail somewhat more fully the peculiarities of the breeds generally recommended for dairy purposes, and some points bearing upon the indications which distinguish good from bad cows.

Of what may be called the pure dairy breeds, that of Ayrshire may be said to represent the "farm-dairy" cow, the Alderney or Channel Island breed, the "country-house," or "family dairy" cow. The other breeds are the Short-horn, the Suffolk, and the Kerry, or Irish, and the Bretonne; all of which are held in high repute by various dairymen. The Yorkshire, a valuable milking-cow, is sometimes classed separately, but it is essentially a short-horn cow. It is held in high repute by London dairymen. The Ayrshire is, perhaps, one of the most valuable dairy cows we have. The short-horn is now rapidly influencing all the other stock, and is becoming the cow *par excellence* for large farms, as the Alderney is that for the small farms of amateurs. A cross of a short-horn with the Alderney is, perhaps, for milking purposes the best we have got. The following remarks of the eminent authority, Dr. Voelcker, will be useful here as bearing upon the question, What is the best breed for dairy purposes?

"As a general rule, small races, or small individuals of the larger races, give the richest milk from the same kind of food. Whether it is more profitable to keep small or large sized breeds is another question, of which we shall presently speak. Where good quality is the main object, Alderneys, perhaps, will give most satisfaction, for they give a richer cream than any other breed in common use in this country. The small Kerry cow and the miniature Bretons also produce extremely rich milk, but, of course, in much less quantity than the larger breeds. For dairy purposes, in cheese districts, the Ayrshires are justly celebrated; indeed, they seem to possess the power of converting the elements of food more completely into cheese and butter than any other breed. The food in their system appears to be made principally into milk, and not into meat, consequently, they are good milkers; but, unlike the short-horns, do not fatten well. Remarkably large quantities of milk have been produced by cows of this breed. Thus a cow, bought by the Duke of Athol from Mr. Wallace, Kirklandholm, and, probably, in his Grace's dairy at Dunkeld House at the present time, produced 13,456 lbs., or about 1,305 gallons of milk, from the 11th of April, 1860, to the 11th of April,

1861. If we estimate the value of the new milk at 9*d.* a gallon, the year's produce would be worth £43 10*s.*

"With a view of encouraging this useful breed, the Ayrshire Agricultural Society has an annual milking competition, at which prizes are given for the Ayrshire cows yielding the greatest weight of milk at four successive milkings; and also from cows whose yield of milk the best return in butter is made. No restriction whatever is placed upon competitors in regard to the keeping of the cows. The following is a statement of the quantities of milk produced by the cows in the competition of 1861, and of the butter churned from the milk:—

No.	Cow belonging to	Greatest milking.		Average of town milking.		Weight of Butter.	
		lb.	oz.	lb.	oz.	lb.	oz.
1	A. Wilson	27	12	24	3½	2	2
2	J. Hendrie	26	0	24	5	2	14½
3	W. Reid	25	7	20	8¾	2	9
4	W. Reid	30	15	27	5½	3	6⅓
5	R. Wallace	28	4	28	8½	1	9½
6	R. Wallace	25	5	23	8¼	1	15

"The short-horn, though more particularly distinguished for its precocity and excellence as a meat-producing animal, is, nevertheless, an excellent milking-cow. Some families of even pure-bred short-horns are, indeed, distinguished in this respect; for when well fed, they will yield much milk, and at the same time go on improving in condition. On this account they are preferred by many to Ayrshire, Alderneys, and other breeds of peculiar or local merit, and are becoming more and more the principal dairy-breed of England.

"The Yorkshire cow, essentially a short-horn, is the favourite breed of cow-keepers in London, and other large towns, as it surpasses all others for the quantity of milk it yields. The milk, however, compared with that of the smaller breeds, is more watery, and less rich in butter, and better suited for direct consumption than for the making of butter or cheese. The statement made by some, that pure-bred short-horns are not good milkers, is emphatically denied by others; the truth is, there are short-horns which are good milkers, and others which are not, and it remains for the dairy-farmer to pick out and propagate those families distinguished rather for milk-producing qualities than for fattening properties. As a rule, animals remarkable for the rapidity with which they put on flesh and fatten, are not the best milkers, and *vice versa*. Short-horns, on the whole, perhaps, are more useful for general dairy purposes than any other breed."

Of points or marks indicating good cows.—As to the form of a good cow, the hind-quarters should be much heavier than the fore; the head should be slim; the loins wide and broad; the skin should be soft; and when the hair is turned back, should show a yellow colour. The skin should be soft and mellow on all parts of the body, but if it be peculiarly so on the rump bones, on each side just where the tail is inserted, it is thought by good judges to be an infallible sign of a good milker. The age of a cow is of great importance, as an old cow is of no practical use in a dairy. Cows are generally in their prime when they have had their second or third calf, and may be milked up to their sixth or seventh year with profit. Much, however, as may be supposed, depends upon the individual characteristics of the cow. It is therefore of importance to judge of the age of a cow. The teeth afford naturally the most trustworthy means to ascertain this; but so much facility is given for treachery and roguery to be carried out in connection with them, that the indications they afford are not always to be depended upon. The horns afford pretty reliable means by which the age of the cow can be ascertained. The length, thickness, or shape of the horn varies with the animal, and in different breeds; but in all its length increases in certain marked gradations. Each of these is indicated by the bulging out, or the formation of an annular knot near the base of the horn, and the "circular depression between the skin and the bulging horn is the sign that the animal has attained another year." "But in calculating," says Professor Gamgee, "the age of a cow at five or six, an error may bo incurred by supposing that the first marks can be readily perceived." It is only the third year's circle which first shows itself distinctly developed. The indication of age afforded by the teeth involve considerations of too detailed a character to be fitted for discussion in a rudimentary treatise of this nature; we therefore refer the reader to Professor Gamgee's work on "Dairy Stock" (T. Jack, Edinburgh), where he will find several notes and illustrations on the subject.

We have said that the form of a cow should be considered; but it not seldom happens that a cow with what is considered an ugly form is a much more valuable milking-cow than one of which the form presents all the points deemed desirable by some authorities. "The head should be clearly distinguished," says the authority we have already quoted, "from that of a bull, by lightness, sharpness of outline, clean bone, well-developed skull, with broad forehead and well-mounted horn. I do not like a long-faced cow, with narrow cranium, heavy brow, and thick, prominent muzzle. . . . . The neck varies considerably in different breeds. It should be light, of moderate length, with a nice curve, so that the head, when raised, appears prettily held. From the withers to the root of the tail the spine should be straight and broad; the withers round and broad, the loins wide, and, according to some, the spinous processes of the lumbar vertebral should bend well forwards, so as to leave space between them and the spinous process of the sacrum." This last indication Professor Gamgee thinks of importance, and says, that "he has repeatedly known persons rely much on the breadth of space between the last spine of the lumbar vertebræ and that of the sacrum as a sign of a good milker."

The udder, as might be supposed, affords valuable indications of the milking capabilities of a cow. It should, in form, be long from front to back, stretching well up on the belly, broad behind, filling up the space between the legs well, but should not be too deep vertically—that is, being too far down—space being obtained in it rather through length and breadth. It is of essential importance that not only should the teats be well set on the udder at equal distances, moderate in length, straight, and of equal thickness throughout, pointing at an angle outwards, but also that each teat be perfect passing milk. Some tricky salesmen often take in unwary purchasers by this, stating that it does not matter, inasmuch as the milk will be withdrawn from the udder by three as well as by four teats; whereas each teat is connected with a set of milk vessels or glands totally distinct from the other sets; so that the loss of a teat is simply equivalent to the loss of a certain proportion of the milk.

Another indication of a good milking-cow is the development of the milk veins, so called; these are large veins which run along the side of the belly, and supposed popularly to be, but are not in reality, connected with the udder. They should, however, be large, well developed, and join the udder in small swellings, or enlargements. Professor Gamgee places great stress on the importance of the veins, or rather network of veins, being large, which "are seen beneath the skin over the fore-quarters of the udder."

The most celebrated, as it is stated by nearly all our competent authorities to be the most successful, system by which the milking capabilities of cows can be decided by inspection, is that of Mons. Guenon, of which the signs are the tufts of hair, called the scutcheon, or escutcheon, with which all oxen are marked on the buttocks. Of this system the following is a brief description*:—

"It can scarcely have escaped the reader's notice, that the hair on the buttocks of cattle grows in two different directions, one portion pointing upwards, and another part downwards, and thus producing a sort of fringe at the point of juncture. This hair, which has an upward tendency, has been termed the 'escutcheon.' A very extended observation has proved that, *other conditions being equal*, the modification of form presented by the escutcheon will lead to an estimation, not only of the *quantity* of milk which the animal will produce, but also of *the time* during which the cow will *keep up the supply* of milk. Without going much into detail on this point, I may briefly state, that the larger the extent of the escutcheon, the greater is the promise of milk, and also of the continuance, even after the cow is again in calf. A cow may have a small escutcheon, and yet be a good milker; but observation leads to the conclusion, that if she possessed a more fully developed escutcheon she would have been a better milker. It may be considered a point of merit, not as *deciding* whether or not the cow is a good milker, but rather as an additional indication, which may be taken into consideration in conjunction with other characteristic points. It is also desirable, in estimating the extent of the escutcheon, to make full allowance for the folds in the skin, otherwise a large escutcheon may be taken for a small one. Besides the escutcheon, there are tufts of hair (*epis*) which have a certain degree of value when seen upon the udder of a cow."

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* For a complete description, with illustrations, of M. Guenon's system, see the last edition (the eleventh) of the "Complete Grazier." Lockwood and Co., London.

In addition to possessing all the indications which we have pointed out, it is essential that the cow possess quietness of disposition and docility; a bad-tempered, restless cow is never a good milker. The following remarks by an eminent American agricultural authority will usefully conclude the present chapter:—

"The best way, after all, to find out the good and poor cows of the yard, is to see how much butter each cow will make in a given length of time. Such an experiment should be made in different seasons, and at different times in the season. Experiments of this kind will cost time and trouble, but may be valuable to the dairyman. Cows are apt to vary in the amount of butter they will make in different seasons. This variation is more apparent in young cows than with those of mature age. The man whose business it is to sell milk, will, of course, look for such cows as will give the largest quantity. The quantity of milk that a cow may give may deceive a man very much as to the true value of the cow for making butter; and cows may be retained in the dairy because they give a large quantity, and others may be disposed of because they give a small quantity, when the truth is, the poor cows are kept, and the good ones are disposed of. Another and better way to keep up the supply of cows in the dairy, is not to depend upon buying, but to raise them. Select such cows as are known to be of a good milking family."

CHAPTER II.

THE FEEDING AND MANAGEMENT OF COWS.

Much of what has been said in the Third Volume on the fattening of cattle is applicable to the feeding of dairy cows; the principal points of difference between the systems employed being the quality of the food and the house or stall management, these having special reference to increasing the quantity of milk and of its butter and cheese producing qualities. From what we have all along insisted upon as one of the peculiarities of modern farming, namely, that the practice of one district is no guide to that of another, all being dependent upon peculiarities of soil, climate, or locality, the reader will be prepared to find that much diversity exists in the practice of different farmers as to the best mode of managing a herd of dairy-cows.

Perhaps the most generally useful, as it is certainly the most complete in its details, is the Essay of Mr

Horsfall on "Dairy Management," published in the 37th and 39th parts (vols. xvii. and xviii.) of the Journal of the Royal Agricultural Society of England, and from the highly valuable information given in it; it should be studied closely by every one purposing to undertake the care of a dairy. We shall do the reader a service by giving here a few extracts from this valuable paper. Mr. Horsfall's aim was not only to produce a large quantity of milk rich in butter constituents, but also to keep the animals in good condition, so that they could be sold with a profit to the butcher when they were not profitable as milkers. It appeared to him "an object of importance, and one which called," he says, "for my particular attention, to afford an ample supply of the elements of food suited to the maintenance, and likewise to the produce, of the animal; and that if I omitted to effect this, the result would be imperfect and unsatisfactory. By the use of ordinary farm produce only, I could not hope to accomplish my purpose. Turnips are objectionable on account of their flavour, and I seek to avoid them as food for dairy purposes. I use cabbages, kohlrabi, and mangold-wurzel, yet only in moderate quantities. Of meadow hay, it would require, beyond the amount necessary for the maintenance of the cow, an addition of fully 20 lbs. for the supply of casein in a full yield of milk (16 quarts); 40 lbs. for the supply of oil for the butter; whilst 9 lbs. seem adequate for that of the phosphoric acid. You cannot, then, induce a cow to consume the quantity of hay requisite for her maintenance, and for a full yield of milk of the quality instanced. Though it is a subject of controversy whether butter is wholly derived from vegetable oil, yet the peculiar adaptation of this oil to the purpose will, I think, be admitted; I had therefore to seek assistance from what are usually termed artificial feeding substances, and to select such as are rich in albumen, oil, and phosphoric acid; and I was bound also to pay regard to their comparative cost, with a view to profit, which, when farming is followed as a business, is a necessary, and, in any circumstances, an agreeable accompaniment. I think it will be found that substances peculiarly rich in nitrogenous or other elements have a higher value for special than for general purposes, and that the employment of materials characterised by peculiar properties for the attainment of special objects, has not yet gained the attention to which it is entitled. I have omitted all reference to the heat-supplying elements, starch, sugar, &c. As the materials commonly used as food for cattle contain sufficient of these to effect this object, under exposure to some degree of cold, I have a right to calculate on a less consumption of them as fuel, and, consequently, a greater surplus for deposit, as sugar, and, probably, also in fat, in consequence of my stalls being kept during winter at a temperature of nearly 60°. I now proceed to describe the means I am using to carry out the purposes which I have sought to explain. My food for milch cows, after having undergone various modifications, has for two seasons consisted of rape-cake 5 lbs., and bran 2 lbs., *for each cow,* mixed with a sufficient quantity of bean-straw, oat-straw, and shells of oats, in equal proportions, to supply them three times a day with as much as they will eat. The whole of the materials are moistened and blended together, and after being well steamed, are given to the animals in a warm state. The attendant is allowed 1 lb. to 1½ lb. per cow, according to circumstances, of bean-meal, which he is charged to give to each cow in proportion to the yield of milk, those in full milk getting 2 lbs. each per day, others but little. It is dry and mixed with the steamed food on its being dealt out separately; when this is eaten up, green food is given, consisting of cabbages, from October to December, kohl-rabi till February, and mangold till grass-time. With a view to nicety of flavour, I limit the supply of green food to 30 to 35 lbs. per day for each. After each feed, 4 lbs. of meadow hay, or 12 lbs. per day, is given to each cow; they are allowed water twice a-day, to the extent they will drink. . . . . During May, my cows are turned out on a rich pasture near the homestead; towards evening they are again housed for the night, when they are supplied with a mess of the steamed mixture, and a little hay each morning and evening. During June, when the grasses are better grown, mown grass is given to them instead of hay; and they are also allowed two feeds of steamed mixture. This treatment is continued till October, when they are again wholly housed."

Dr. Voelcker, in a recent paper, gives the results of a "series of valuable experiments" made by Mr. Struckmann in Germany, the object of which "was to determine what quantity of brewers' grains are necessary to replace 1 lb. of rape-cake, and also the comparative practical effect of the same amount and quality of food upon good and bad milking-cows."

From these experiments we gather (1) that the food which produced the most milk was 5½ lbs. of rape-cake, 36 lbs. of mangold, and 25 lbs. of oat-straw; (2) that 1 lb. of rape-cake produced on an average 1½ lbs. of milk; (3) that 1 lb. of brewers' grains produced about ¼ lb. of milk; (4) 1 lb. of rape-cake is equal to 4 lbs. of brewers' grains in its milk-producing powers; (5) that while the milk produced by the rape-cake was richer in butter, the butter produced by the grains was more delicate in flavour.

Experimental periods.	Duration of each experimental period.	Daily food per Cow in each period.	Average weight per head.		Daily average yield of milk.		Daily produce of Butter from the Milk of eight Cows
			Superior Cows.	Inferior Cows.	Superior Cows.	Inferior Cows.	
			lbs.		litres.*		
1	Feb. 22 and March 1.	18 lbs. brewers' grains 36 „ mangold . . 25 „ oat straw . .	1065 1087	1039 1042	43·6 9.6	29·5 6.5	3·4
2	March 19	5·4 „ rape-cake . . 36 „ mangold . . 25 „ oat straw . .	1097	1072	46·5	30·5	3·8
3	March 27	4·5 „ rape-cake . . 36 „ mangold . . 25 „ oat straw . .	1118	1085	43·4	29·2	3·6
4	April 5	18 „ brewers' grains 36 „ mangold . . 25 „ oat straw . .	1112	1118	40·9	28·7	2·9
5	April 14	18 „ brewers' grains 45 „ mangold . . 25 „ oat straw . .	1094	1086	37·9	27·7	2·9
6		12 „ brewers' grains 45 „ mangold . . 25 „ oat straw . .	1116	1098	33·9	26·0	2·7

It is generally understood that the addition of a small quantity of oil-cake—say 2 lbs. daily—in the food of dairy cows, increases both the quantity and quality of the milk. Dr. Voelcker, however, mentions a case —that of Mr. Stratton, near Bristol—where this addition to the food had no such effect. Some experiments made by Dr. Kirkpatrick at the Royal Agricultural School, Glasnevin, appear, however, to corroborate the result of the trial named by Dr. Voelcker. These experiments were made with a view to test "the influence of different kinds of feeding on the quantity and quality of milk. Four cows of average size, and in good milking condition, were put under experiments. At each change of food an interval of several days was allowed to elapse before any record was made of the results. From the 13th March to the 9th April, each of the cows consumed daily, 75 lbs. mangold-wurzel; 6 lbs. bran, which cost 6*s.* the cwt.; 4 lbs. rape-cake, which cost 7*s.* 6*d.* the cwt.; 18 lbs. straw.

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* 4½ litres =1 imperial gallon.

"During those twenty-five days, the average yield of milk (10 quarts per day) was about the same as in the previous interval, when they were fed on more simple and less concentrated food. And on testing this milk by the lactometer, or by churning a given quantity of it, no perceptible improvement in the quality of milk obtained from raw roots and straw was observed. It was found, however, that the animals had increased considerably in weight. We give the numbers as they were noted:—

No. of Cow.	Weight on 13th March.		Weight on 7th April.	
	Cwt.	stones.	Cwt.	stones.
1	9	0	9	5
2	10	5	10	7
3	9	4	10	5
4	9	3	9	7
	38	4	41	0

"The four cows had therefore increased in live weight 20 stones in twenty-five days. If we assume, with Lawes and Gilbert, that 70 per cent. of this increase is composed of flesh and fat, we can fairly approximate as to the money value of this increase."

The following, from the pen of Mr. A. Macdonald, of Bowood House, Calne, will be useful here. Reference is specially made in it to circumstances to which we have alluded in Volume III. of this series.

"1. *Treatment.*—The constitution of cattle is often ruined by their being kept out in the fields during the inclement months of winter. A cow should never be caught in a cold night, for a certain consequence is an immediate depreciation of the quality of the milk, and an injury to the cow, and if suckling the calf, to that also. But, I may be asked, is it not their nature to be out at night? It was; but by the improvements in breeding (which has made them less hardy), and the artificial grasses they eat, it is no longer so. A Highland cow eats the natural herbage of the hills, and knows for hours before a storm is coming, and will feed on for a considerable distance till it reaches a place of shelter from the cold. Bring that same cow from its natural grass, feed it on ours, confine it in a field where it cannot obtain shelter, and it will soon be in a worse condition than when brought here. It must be housed at night in a building completely enclosed and properly ventilated.

"Another most reprehensible plan is to allow (as is done in thousands of cases) animals to have calves before they are two years old. The constitution of the mother is thereby seriously impaired, and the stock is weakly in consequence. If we get an epidemic among our stock, the loss from this system will be fearful. They should never have a calf till three years old. I have noticed in many parts of the country that fattening bullocks (those stall-fed excepted) are never housed at night. This is a most improper plan. There should be a covered shed for these erected at one side of the field, closed at the back and ends, but open in front, and divided into compartments for each bullock. Give at night to each a few handfuls of hay, and two ordinary-sized turnips, sliced just previous to being given. I adopted this method with the worst half of some Highland bullocks, allowing the better half to lie out at night. At the end of five months those housed were pronounced by competent judges to be worth £3 per head more than the others. A steward to a noble lord writes me—'I adopted your plan with a part of my bullocks, and now, at the end of one month, I consider those housed are worth £1 more than the others. In future I shall take care to house all my cattle.' A gentleman writing to the *Times* spoke of a number of cattle which had been infected with the 'foot and mouth disease,' through travelling in a filthy railway truck. He stated that when taken out into the park they were perfectly wild, and would do nothing for days but drink water, which resulted in lung disease, and he was obliged to kill a great number of them. Access to water was a great evil. They should have, if possible, been confined till the sensation of railway travelling had gone off, and had a little hay, and a very little water in a tepid state, given to them. The disease would then have been cured.

"2. *Feeding*.—It is the custom to give milch cows as much food as they can eat—in fact, more than they can consume. Thus a twofold evil results, viz., a loss of food, and a decided injury to the animal. Never give, therefore, as much as it can eat.

"*Water.*—Cows are allowed to drink far too much, the consequence being a great deterioration in the quality of the milk. It is a well-known fact that the London milkman does not require to add water to his milk, simply because he waters the food of his cows, and gives them large quantities to drink before milking them. He thus obtains quantity, not quality. Cows in milk should have but little water, and in the mornings should be obliged to walk from their house some distance before drinking. They will then eat as they walk, and on arriving at the water will drink much less than they otherwise would do. The result of this treatment will be cream like mine, of such a consistency that a spoon would stand perpendicularly in it in the middle of winter. By this method I have obtained from twelve cows 5 lbs. more butter per week, and of a far better quality than was before got by the old plan of feeding Many of the aristocracy have frequently asked me how I produced such excellent cream and butter; and I have as invariably attributed the result to the way in which the cows were fed and housed at night. Cows with calves should be still further attended to in this respect. There is a great analogy between a woman with a child, and a cow with a calf. How many are the restrictions laid upon a woman by a medical man if she is nursing a gentleman's son. He knows that what is injurious to the elder will be alike to the younger. It is exactly so with the cow; it is injured by being allowed to eat improper and too large quantities of food, and drink too much water; the milk is impoverished and unwholesome, and the calf, if it lives, is of a weak debilitated constitution. Give, therefore, less food and less water, and you will have healthier stock, and far better milk and cream."

Dr. Voelcker, as corroborative of the fact, which seems obvious enough, but, nevertheless, is really very much overlooked by dairymen, that the food has an influence on the quality of the milk, mentions that the cows of the

Agricultural College, when taken in from the scanty supply of the grass in the October fields, and placed in stalls, and fed with hay, roots, and meal, the quality of the milk increased at once, and gave 4½ per cent. of butter in place of 3½ per cent. when not so treated; the evening's milk, after the cows were out all day at grass, yielded only 3 per cent. of butter. In the winter months the cows were wholly kept in doors, when the milk was at once more abundant and richer in quality. In February the daily food was as follows:—

At 6½ a.m.	12 lbs. of hay.
9 „	15 lbs. of mangolds, cut fine, and mixed with 3½ lbs. of straw chaff and 1 lb. of hay chaff.
11½ „	4 lbs. of rape cake.
3½ p.m.	15 lbs of mangolds, cut fine, and mixed with 3½ lbs. of straw chaff and 1 lb. of hay chaff.
5 „	12 lbs. of hay.

We now give brief details of other modes of feeding, the first being taken from the *Agricultural Gazette*:—

"Half a cwt. of turnips, 16 lbs. of hay, and 24 lbs. of wheat and oat straw daily are very large rations for a small cow—say 6 score a quarter. Cut the straw into chaff, mixing a very small quantity of hay, and pulp the roots, mixing them all together. You will then save much hay."

The following is the mode detailed in the Prize Essay on "Dairy Management," published by the Yorkshire Agricultural Society, and of which the Rev. Mr. Pulline is the author:—

"It is a good plan to take up the cows as soon as the nights become cold—say the middle of October—as the white frosts which occur about that time cause them to run off their milk. They are turned out during the day till the middle of November, if the weather keep fine. From that period till May Day they are kept entirely in the house, except being turned out a few minutes every afternoon to water. They are milked at half-past five o'clock, morning and evening. As soon as the man who feeds them comes in the morning, the dung is all removed, and each cow has a feed of 28 lbs. of roots :—

At 7 a.m. 7 lbs. of chopped hay.
9 „ A pail of water, with ½ lb. of bean meal stirred into it.
10 „ 2 lbs. of linseed cake.
1 p.m. 7 lbs. of chopped hay.
2 „ Turned out to water, and then 2 lbs. of linseed cake.
5 „ 28 lbs. of roots
8 „ 7 lbs. of chopped hay.

"On this system of management five cows produced in seven weeks, from the 25th of March to the 10th of May, 191 rolls of butter, 24 ozs. to the roll—equal to about 254 lbs., 16 ozs. to the lb. To this must be added, 154 quarts of new milk, and 42 quarts of cream, consumed in the house. The milk was not regularly measured, but averaged about 60 quarts per day."

The following description of the mode of management of a cow on a small occupation, from the pen of the well-known writer, Miss Martineau, will be a useful conclusion to this chapter, and be specially interesting to those of our readers who may contemplate a little amateur farming :—

"The mode of life of a stall-fed cow is very simple. At six A.M., at latest, in summer, and seven A.M. in winter, her stable should be cleaned out, all liquids swept into the drain and tank, all solids barrowed to the large tank down the field, and powdered charcoal deposited where most needed. A plentiful supply of air has been provided during the night by the opening of some of the windows, of which there are three. A small window in the roof, opened by a cord, secures the escape of foul air. The stable, being close to the cottage, is well warmed in the winter. We find the cows do better without litter than with any kind we have been able to try. Cocoa-nut fibre mats were presented to me for trial, when it appeared that fern, haulm, and straw tempted the cows to eat their litter; but the mats were too warm, and the animals' hoofs grew long, and became brittle. A smooth surface of cement or asphalt appears to answer best, provided it is kept in thorough repair, and made sloping in the slightest possible degree, so as to allow liquid to run off, without fatiguing the cow by depriving her of a level standing-place.

"The cleaning of the place being done, the next thing is the milking, and then the breakfast, and then the rubbing down of the animal. Her coat should be first curried, and then brushed every day, and her legs, particularly the hind-legs, well rubbed. Her coat ought to be as glossy as that of a horse; and if she is not thoroughly freed from dirt, she will be restless in her eagerness to rub herself against wall or post on every side. Duly dressed, she lies down to ruminate in calm content.

"In the summer, when the hay is growing, she has cut grass more or less every day. We get it from sundry patches on our own ground—from strips under the trees, from the slopes, the borders, and three-cornered bits in angles of the garden, and from the ditch, hedge, and road in the half-acre; and also from any neighbour who will let us have it for the cutting, or a trifle over. There is some every day till the cows can turn out after the hay-making. Meantime, there are the last of the mangold roots, and there is chopped straw dressed with Thorley's cattle-food, which is a great comfort as a resource when food is scanty or precarious. The tradition of our district, of the eagerness of the cattle of the monks of Furness after the ash and holly-sprays on the mountains, guides us to another resource. A cow will brave many obstacles to get at the young sprays of the ash; so we crop ours from the pollards. The same with nettles in their season. We must not suppose these things bad food because *we* should not like them. Brewers' grains are another resource. Cows are very fond of them. When the roots are done, the cabbages are coming on, and then many helps arise; the thinnings of the growing turnips and mangold, and afterwards their crops of leaves. These things, with the ever-growing grass, carry us on to November, when the last cabbage is eaten, and the pasture must be manured. Then begins the winter routine. The cinders from the house, and a penny sack of shavings from the bobbin-mill, light the boiler fire, which keeps the food warm for the day. The turnips are eaten first, because they do not keep so well as the mangold. A cwt. of turnips per day is rather more than two cows want, if there are carrots for them, or cut straw, with Thorley's food. The roots are sliced and boiled with the straw. The secret of giving turnips without fatal damage to the cream and butter is to pour off all the water, and give the roots dry, with fresh water to drink, of course. The hay is the dessert, given dry, if the cows prefer it so. To keep their teeth in use, they may have a mangold root or two in the course of the day—'to amuse themselves with,' as the man says. They have three regular meals in the day, and something more during the longest days. In winter, they settle well for the night after six o'clock."

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The following is Mr. Caird's description of the dairy management adopted on a large dairy farm:—

"The dairy cows, forty-eight in number, are kept for supplying Whitehaven with milk and butter. This number is regularly maintained in milk throughout the year; those which have become dry being either fed off or sent to another farm, and more moderate feeding, till they are ready again to take their place among the milking-stock. The best heifer calves are reared to keep the stock good. On the 1st of November, the winter management begins. The cows are then kept constantly housed, except being turned out, two or three at a time, for a few minutes daily, to the drinking-pond. They get turnips twice a day, 2 stones weight at each time. They receive, likewise, a cooked mixture of oats and tares, grown together for that purpose, and cut by the chaff-cutter, then boiled with chaff, and given, twice a day, a bucketful to each cow at a time. The boiled mixture is placed in a stone trough for twelve hours, to become cool before being given to the cows. They also receive a small handful of the best old hay four times a day, the forty cows consuming nearly a ton each during the winter season. The cows receive a little cut straw the last thing at night. By the 1st of May they go to grass; they are milked daily at five A.M., a portion of them at one P.M., and the whole of them at five P.M. They are then all turned out again to a pasture-field near the house till nine, when they are brought in and kept in the house all night. They are thus protected from the chills of damp, cold nights, and require no food till again turned out to their pasture, after being milked in the morning."

The following, from the "Cyclopædia of Agriculture," describes the mode of dairy cattle management adopted by Mr. Young, of Fife:—

"In summer the cows are pastured about ten hours daily, upon one or two year old clover and ray grass lea, of which two statute acres are allowed to each animal. When the grass is abundant, which is generally the case during the three summer months, the cows are kept in the pasture every day from five A.M., to eight P.M., and get nothing else except a little *dreg* (refuse of the stills), in tubs placed in the field, to drink; but when the grass begins to get hard and more scanty, a plentiful allowance of clover and vetches is given in the house at night, and also a quantity of *draff* (brewers' or distillers' grains). When the weather is very hot, and gnat-flies are troublesome, the cows are kept in the house during the day, and well fed with clover. They are, however, turned out to the pastures in the cool of the mornings and evenings.

"The quantity of cut grass and vetches consumed by thirty-six cows generally averages about four acres of the former and one acre and a quarter of the latter during the season; and in autumn each cow receives one-third of a bushel (15½ lbs.) of brewers' grains every day.

"Winter feeding commences about the middle of October, when the cows are tied up in pairs in the stalls. At eight A.M. each cow gets boiled food, consisting of 30 lbs. of swedes, 1¼ lb. of linseed, 2 lbs. of bean or pea meal, and a quantity of chaff and light grain, unfit for making meal; and a liberal allowance of oat straw is given as soon as this is finished. At ten A.M. 60 lbs. of yellow turnips and straw afterwards. At two P.M. one-sixth of a bushel of grains; and, lastly, at five, P.M., 60 lbs. of yellow turnips and cut straw as before.

"The cows are milked thrice a day in summer: at five o'clock A.M., at midday, and at eight P.M. In winter they are milked only morning and evening; but the newly-calved cows are always milked three times a day. The cows are allowed to run dry about two months before calving; but, in consequence of the high feeding they receive, it is always difficult to get the milk off them."

"Mr. Young considers that to attempt putting the milk off cows fed in the manner his are, by low diet, has the effect of injuring their constitution. When his cows are to be run dry, he removes them to a separate byre, and gives them straw and turnips only, but a liberal allowance of both. Boiled or cooked food he considers injurious to them when they are not giving milk; but a fortnight before calving draff is given, and about ten days after that period the high feeding is again resumed. When cows are to be fattened off, the quantity of linseed, bean meal, and draff is increased, but they are milked as usual; yet, notwithstanding, they are very soon ready for the butcher. . . . . . . The uniform high system of feeding pursued by Mr. Young gives results which vary little throughout the year. The greatest decrease of milk, except when the cows are being run dry, is when they first go to grass, which is exactly the reverse of what happens with cows underfed in winter. The average proportion of milk, cream, and butter to each other is 1 gallon of cream to 9 of milk, and 3 lbs. of butter to 1 gallon of cream, or 1 lb. of butter to 3 gallons of milk as it comes from the cow."

As regards the course of cropping pursued on dairy-farms for the raising of the food for the cows, it is impossible, within the limits of the present treatise, to give full details—indeed, it scarcely falls within its scope; we can therefore glance, and glance but briefly, at some of the leading features of the subject. Pasturage is generally the grand resource of the dairy farmer, and is usually available for about six or seven months. There are some popular notions respecting pastures to which reference may here be made; first, that pastures are more valuable when old—that is, where the fields have been for a long period under grass, than when new—that is, where the fields are under grass for the period usually adopted in rotation, namely, one, two, or three years. It is doubtful whether the herbage of old pastures is better than that of new, as affording milk richer in quality, and more abundant in quantity. The point, after all, is at present left open, for, in the absence of any trustworthy evidence on it, conjecture is all that is left us. The probability is that abundance of grass is the point to be looked after, rather than its age; the fact, however, should not be lost sight of, that in old pastures herbs of a condimental or medicinal nature abound which are not always present in new pastures, and we know that the variety of herbs in a field exercises some influence upon the health of the animals partaking of them; and seeing that they take these herbs as they come in season, it is probable that the influence upon their health, which they exercise, is a good one. The whole subject requires, however, to be investigated with care; for a note or two in connection with it see Division First, Vol. III., "Outlines of Modern Farming," in this series.

Old pastures are so much esteemed in certain districts that improving them by the application of appropriate manures is rarely thought of; that of ploughing them up, placing them under a course of cropping, and then after laying them down with new grasses, is deemed little short of sacrilege. There is no doubt, however, that in many cases these processes, hinted at above, would be economically beneficial. In feeding cows upon pastures, great harm is done to them by putting too many cattle upon the land; it is by far the most economical practice in the long run, to under rather than to over stock pastures.

The food obtained from the pastures being only available for one half of the year, it is necessary to supplant it by other kinds of food, as hay, turnips, &c., and the like; for notices of these and modes of cropping adapted to them, see Vol. I. of the "Outlines of Modern Farming" in this series, and for a description of their value as food, see Vol. III. of the same. The whole aim of the dairy farmer should be to make all his cropping subservient to the maintenance of his dairy stock in the best possible condition; to secure the best herbage in his pastures for summer feeding, supplementing this with grass, cut food, or rape, clover, rye-grass, &c.; and the best hay, turnips, cabbages, and the like, for winter keep.

The following extract from a paper in the Journal of the Royal Agricultural Society, by Mr. Harding, on "Recent Improvements in Dairy Farming," will be useful in connection with the preceding remarks:—

"In order to show an increase in the dairy produce of any given district, it would be necessary to know its aggregate amount at different periods; but as, to the best of my knowledge, no records exist which furnish this information, as derived from any dairy district in England, it will be impossible to contrast our present average produce with that of former years. The only course, therefore, which we can adopt is to take a single farm which may be considered a fair specimen of the district in which it is situated. A farm of 150 acres in ——————, of fair quality, divided into 110 acres of pasture and 40 of arable, would, some years ago, probably have been stocked with thirty cows, five or six heifers (to keep up the stock), besides a few horses. The arable course would have been 1, fallow; 2, wheat; 3, beans; 4, wheat again; 5, clover mown twice, then fallow again; barley being grown occasionally on suitable soil.* It was thought that on the pasture land no more cows could be kept than the one half would maintain in summer, the other half being mown for winter keep; that would give (allowing 3 acres per cow) 90 acres for thirty cows, and 20 acres would be left for the young stock and horses. The arable land at this time received the greater part, if not all, the manure.

"A farm of this description would now keep fifty cows. The larger part of the arable land would be in grass and roots, corn being grown only on the decay of the grass plant, which, instead of being mown, would be grazed by the cows, and admit of being stocked a fortnight earlier in spring than the meadow grass; the straw would be cut into chaff and mixed with roots, meal, oil-cake, or some other substitute, to make it equal in nutriment to hay. The roots would be chiefly grown by artificial manures, and a portion of them fed off by dry sheep, so that a considerable part of the yard manure could be spared for the pasture land. Although I have spoken above only of an increase of twenty cows, I know some farms on which the extra number is even larger.

"When the farm is wholly pasture, as is the case with a large number of the dairy farms of this county, there cannot be as large an increase of produce as is stated above. Yet even here, as the land is made to carry as much stock as possible, the increase in the number kept is considerable. Some farmers will feed nearly all their land, and sell their cows in the autumn, looking forward to replacing them in the spring of the year. This seems to be an expensive mode of increasing dairy produce; but where the land produces a large quantity of milk the grass is of far more value than the hay.

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* Clover is not so much sown on dairy farms as it would be if it could be safely fed by cows.

"Others, again, have adopted the plan of preserving a few acres of aftermath (after being fed once) till the spring; the young grass is thus drawn up by the shelter which the old affords, and consequently comes to feed earlier than it would otherwise do. This feed is valuable for turning out the cows by day; it thus both lessens the consumption of hay and increases the yield of milk. Among my acquaintance, the farmer who realises the largest amount of profit per cow lives in Leicestershire, and makes both butter and cheese. His farm is a loamy soil, not much affected by drought or wet, so that it is generally in a growing state throughout the summer. He keeps only cows and young stock. The cows have the first feed of every field, the heifers following them in the round of the farm. A man brings up the rear to clean up the droppings, so that the field is clean and fresh for the cows on their next round.

"The building of houses and yards for the accommodation of the cow has not a little tended to an increase of produce, inasmuch as it has enabled us to keep the stock off the land during the winter months. The grass consequently grows earlier in the spring, and enables us to mow earlier, so as to secure a better feed in the after-grass. The introduction of artificial manures has rendered us great assistance, especially on the arable lands, although the pasture likewise feels the effects of the change. Bones have been used on the pasture, but not to such an extent, nor with such success, as in Cheshire. Besides all this, nearly all the wet lands have been drained, and the wide and useless hedgerows grubbed up, so that our atmosphere has become dryer and more healthy. Nature has lent a helping hand, and we have in consequence a longer summer and a shorter winter. A large quantity of cheese is made from some of the hills which formerly only fed a few half-starved sheep and cattle. Some of these improvements may seem to be of small importance to the casual reader; but when carried out through a whole district, the effect is great, and these I believe are the chief causes which have led to the dairy produce of this county being increased within a few years 25 per cent."

The following brief reply to a correspondent's question, by the able editor of the *Agricultural Gazette*, will be interesting to those keeping cows on a small scale, and as showing how the necessary adjustment of cropping and food can be made:—

"'Paterfamilias' has 'about 100 stones of hay, straw for the asking, half an acre of kitchen garden, with some good carrots, and a few good cabbages, cutting and to cut (a quarter sown with rye and vetches for spring, as your *Chronicle* advised a fortnight ago), bran and oil-cake for purchasing, a straw-cutting machine, and a boiler.'—He has ample provision for a cow. She must be fed well while giving milk, and must depend on the straw and a handful of hay daily when dry. We do not know when she is to calve again, and can hardly advise in detail without that knowledge. If the calf does not come till the rye and vetches are ready, then the garden stuff may all be used in the autumn and January, and towards the end of February the cow may run dry; about 20 stones of the hay may be used for the seventy or eighty days during which she will give no milk; with this and straw *ad lib.* and water she will do very well while dry. Till the end of February, *i.e.* about one hundred and forty days, 8 or 9 lbs. of hay may be given daily, and if the supply of green food is as much as 3 or 4 tons altogether, as probably it is, she can have 40 or 50 lbs. of green food daily, using the most perishable sort first. In addition to this, if 20 or 30 lbs. of clean straw be cut up daily into chaff, and buying 3 cwt. of oil-cake (*i.e.* about 140 cakes), one cake be boiled daily in as much saltish water as this 30 lbs. of straw chaff will take up, there will be a capital supply. Of course, towards the end of her milking, the richer food must be diminished gradually, and she must be put gradually on the hay and straw, which may as well continue to be cut into chaff. When she calves, some oil-cake and straw should be given in addition to her green food, so as to let changes of food come gradually."

An important point in the management of cows is their regular milking. The number of times which a cow should be milked a day is a disputed point; some advocating three times—some only twice, namely morning and evening, which is by far the most generally adopted. It is stated, however, by good authority that the quantity of milk is increased by milking three times per day, namely, at morning, noon, and evening. The operation of milking to an uninitiated person is apparently a very simply performed one. It is not so, however; it requires skill, and above all gentleness and patience. Some cows are peculiar in temper, and require to be coaxed to give their milk easily; and impatience on the part of the milker invariably makes matters worse. Cruelty, we regret to say, is too often practised by men milkers. The following is a description of the operation of milking, and of the points to be attended to in carrying it out:—

"The milking of cows resolves itself naturally into two heads, viz., how to milk, and when to milk. If every drop of milk in the cow's udder be not carefully removed at each milking, the secretion will gradually diminish in proportion to the quantity each day left behind. But another reason why every drop of milk should be taken away is to be found in the well-known fact that the last milk is doubly as good as the first milk; hence, if not removed, there is not merely equal, but double loss. Milking should be conducted with skill and tenderness, —all chucking or plucking at the teats should be avoided. A gentle and expert milker will not only clear the udder with greater ease than a rough and inexperienced person, but will do so with far more comfort to the cow, who will stand pleased and quiet, placidly chewing the cud, and testifying by her manner and attitude that she experiences pleasure rather than annoyance from the operation. Cows will not yield their milk to a person they dislike or dread. I have taken the trouble to acquire the art of milking in order to describe it. You take the teat in your palm, enclosing it gradually in your fingers, tighter below than above, but not absolutely tight anywhere; a portion of the upper part of the hand—the thumb is uppermost—embraces a portion of the udder, and the whole hand is drawn gently downwards, towards the extremity of the teat, between the thumb and the fore-finger; very little practice enables the milker to do this with ease, rapidity, and tenderness. I need not say, let the hands be carefully washed before each milking; but I daresay it is seldom thought necessary to wash the cow's teats. This nevertheless should be done, and it will then be found that the milk will flow more freely from the teats than if you wet them with the milk. We now require to consider *when the cows are to be milked*—a question again resolving itself into two minor ones, viz., at what hours, and how often? The ordinary practice is to milk cows twice daily—at about five o'clock in the morning, or in winter as soon after daylight as possible, and again at the same hour in the afternoon, thus leaving twelve hours' interval between each milking. Some recommend milking three times daily during the summer months, stating as their reason, that cows after calving are flush of milk, and that the three milkings are calculated to increase the quantity of the secretion. Some even recommend four milkings during that season. There can be no question but that, when fed in proportion, such a constant demand would necessarily increase the quantity of milk secreted; but then it is likely that the same causes might produce such a depression in the secretary system—naturally consequent upon unusual excitement—as would cause a decrease of milk in autumn and winter, in about equal ratio."

Although the apparatus is considered by many authorities as by no means so valuable a one as it has been represented to be, still, as its use is advocated by other authorities, we deem it right to give here a description of the *milking machine.* This we owe to the *Agricultural Gazette*, by the editor of which we believe it has been drawn up, and who, we believe, thinks favourably of the apparatus.

The apparatus consists of a tin vessel capable of holding 12 quarts. "One half the top of this tin vessel is covered over with a fixed lid, and beyond it on that side a neck extends which receives the pumping apparatus. When the handles are off, this pumping apparatus is easily lifted out of this neck, and easily fixed in. On the top of this pumping apparatus are four elastic cups of vulcanised india-rubber, which ought to be large enough to receive the full-sized teat. The vulcanised rubber contains within the substance of its material a spiral spring, and the whole is made so that when air is pumped out the teat is first sucked in, then the cup closes on it at top, and gradually lower down, the suction overcoming the elasticity in just the proper way and order for bringing pressure to bear on the teat to the complete expulsion of its contents. The pump on each side deals in this way with the two teats on each side. The formation of an elastic cup which should just answer its purpose was a very great puzzle and difficulty, which has at length been solved and overcome. Each pump is worked by a handle. These handles hook into the centres of two disc valves, and then embrace upright arcs which serve as the fulcrum on which they respectively hinge. These arcs are fixed upon the top of the vessel, and enable the handles to have considerable play up and down at the same time that they are working to and fro. The pumps are india-rubber caps covering trumpet-shaped conical mouths (truncated cones opening outwards) on each side of the machine. They fit tightly on to the edge of each trumpet-shaped mouth, and each is furnished with a metallic disc fitting closely to the bottom of the truncated cone. When drawn outwards, as it is by the handle which hooks on to this disc, it leaves a vacuum, if the joints be all tight: the elastic cups connect with the space thus left empty, and so when thus drawn outwards milk flows into the space. There is in the bottom of each a hanging india-rubber flap, which closes on a hole when the valve is thus drawn outwards, and when pushed in again yields, letting the milk which has been drawn fall outwards into the neck of the vessel, and so down into the vessel itself.

"You therefore sit down to the cow, holding your machine with your right hand, by its handle fixed on the middle of its lid; with your left hand you place two teats on that side in the elastic cups which belong to them, and pump them in; holding the machine with the left hand, you use your right to place the pump in the teats on that side. In order to do this perfectly and easily, the teats should be wetted first. Then, holding the machine with the two handles, its weight pulling it down till the handles work each around its fulcrum at the top of the short arc around which they hinge, you lift the machine to the udder while separating the handles; then you let it hang upon the udder, while, pressing the hands together, you pump the milk out of it. The machine thus alternately lifted and allowed to drop, has its weight all the while for the most part borne between the knees of the operator, and it alternately sucks and swallows the milk just as a calf would do. It may be that for cows with very large teats, cups of extra size would be needed; and it is certain that for all cows, patience and perseverance for a few days will be necessary in order to the ultimate perfect satisfaction of all parties with it. It is in the meantime certain that when the cup has fairly grasped the teat, the machine does in a manner very easy indeed to both the operator and the cow extract the contents of it. That is all that is required to ensure that when both are fairly accustomed to it, the whole work of milking will be easily and effectively accomplished. Seven or eight cows to the hour, and perhaps ten cows to a milker, are the usual allowance: when this machine is in use each milker may be expected to manage fifteen or sixteen cows within the hour. And there can be no doubt that a great saving of labour and of temper, and, as we believe, of milk, will be achieved.

"The machine includes fourteen parts. There are the two handles, the two cap valves, and a double disc screwing through each, furnishing the hook to which the handle is attached; there are the two inner flap valves regulating the exit of the milk; the four elastic cups, easily detached, which receive the teats, and the head consisting of two conical reception chambers, into which the milk is drawn, and whence it flows into the vessel below, on to which the whole is easily attached. The whole is most ingeniously and compendiously packed together—the only wearing part is the oscillating cap valve, which is drawn in and out, and they are to be bought for 5*d.* a-piece. The whole is easily cleaned. First, the four cups are put under the surface of the water in a bucket, and with the handles cold water is pumped through them, and the vessel is swilled out: the whole is then taken to pieces, thrown into boiling water, and wiped dry. The price is £2 10*s.* No doubt much more than half of this is royalty and profit. The thing for the manufacturer in fixing on the price, was to determine what the machine was worth—not what it cost. We quite believe that in the spring season of the year, it will be generally and successfully introduced into English dairies."

It is a generally received opinion, that the morning's milk is of a better quality and more abundant in quantity than that of the evening, and so far as our experience and that of others who have had ample opportunity of ascertaining the fact, we are inclined to believe that there is some truth in it. Dr. Voelcker, however, states that his experience inclines him to believe that the matter depends altogether upon the food, its quality, quantity, and the mode of treatment generally of the cows; so that sometimes they will give more in the evening than in the morning at one time, and the reverse.

CHAPTER III.

THE ARRANGEMENTS OF THE DAIRY.—DAIRY UTENSILS.

The essential requisites to be remembered in the construction of a dairy, are that the apartment be light, well aired, cool in summer, warm in winter, so that a temperature not exceeding 65°, nor below 60° or 55° shall ever be attained, and above all that it shall be perfectly free from damp and bad smells. The two last points must be especially attended to, for it is quite impossible to obtain success in either butter or cheese-making where damp and bad smells exist, for there is nothing so easily tainted as milk. The situation of the dairy should be such that the windows look to the north, this ensures an immunity from the hot glaring sun in summer. The roof should be a good non-conductor; the hollow roofing tiles manufactured by Borrie will make an excellent roof-covering, and be safer and more cleanly, harbouring fewer insects, &c., than the straw-thatched roof which is recommended by Dr. Voelcker, on account of its non-conducting properties. The best floor is of flag; or the finely grained slate slabs, now so largely introduced, may be used. The larger the flags or the slate slabs are the better, as the fewer joints will be presented in which water can lodge. The lining of the walls, where perfect efficiency, not the saving of expense, is the object looked after, with the pure white glazed tiles, will be advantageous. These need not be carried farther up than 2 feet 6 inches above the level of the shelves on which the milk dishes are placed, These shelves should be of polished flag, slate, or marble. Wood is the worst material of which to make the shelves and fittings of the dairy; it absorbs the milk spilled upon it, and requires so much water and scrubbing to keep it clean. Ventilation is essential in a dairy; how this can be secured with efficiency and economy will be learned from the "Rudimentary Treatise on Warming and Ventilating" (Virtue Brothers & Co.). The warming of the dairy in winter, which is essential, is best done by hot-water pipes, for the details of which see the treatise above-named. The temperature of the dairy should be kept as uniformly the same as possible throughout the year, the best temperature being 60°. Water should be supplied in abundance, both cold and hot; to provide the latter, an apartment should be constructed near the milk-house, in which a furnace is built to heat a water copper.

So much for the structural requirements of the dairy; as regards its management it is of essential importance that *cleanliness,* perfect and complete, be kept up. Nor to secure this is it necessary to use large quantities of water. Dr. Voelcker points out the mischief done by this plan; water should be used, he says, scalding hot. It is in lessening the quantity of water required to clean them that the advantage of floors of slate or flag, and shelves of the same material, or of marble, are so valuable as compared with wood.

If a cheese-room is required to form part of the dairy structure, it should be free from damp, well aired and lighted, and maintained at a temperature of 63° or 61° uniformly throughout the season. Further details on the arrangement and construction of the dairy, as well as of the byre, shippon, or cow-house, will be found in the volume treating on Agricultural Buildings, in the Rudimentary Treatise published by Virtue Brothers & Co.; but as conveying much that will be interesting and suggestive, we give here an extract from a valuable paper recently read before the London Central Farmers' Club, on "Dairy Management," by Mr. J. Dumbrell, bearing upon the subject of arrangement and construction of the dairy. "The dairy-room," he remarks, "should be used for nothing but the reception of milk. The floor should be a few feet under ground, dry and airy, and shaded from the sun. Benches should be of open wood-work. It should be heated in winter with hot-water pipes, so as to maintain a temperature of about 56°. This is about the easiest mode of applying artificial heat, and as efficacious as any. From experiments which I have made upon the application of heat to milk, I have found that a sustained temperature of 56° raises as much of the cream as can be raised, and that, although by increasing the temperature by direct application of heat, either by applying boiling water, or by placing the pans of milk on a hot plate, the cream may be drier and appear thicker, yet there is in reality no increase of butter. A dry, warm temperature, and a current of air through the room, are the best conditions for raising the cream; a heavy damp atmosphere the worst. The milk pans should be of tin, oblong, with rounded corners. With round pans too much bench room is wasted. With earthenware pans, the lactic acid will, after a time, destroy the glazing; and glass pans chip too easily. A great many new inventions in the way of churns have enjoyed a brief existence, but the old-fashioned box and barrel churns still hold their own against all comers, and are not likely to be superseded."

As giving the reader some idea of the extensive way in which dairy farming is caried on, we add here an account of a "gigantic dairy":—

"Perhaps, however, one of the most extraordinary establishments in the island, in which liquid manuring is adopted as part of the regular system of management, is that of Mr. Harvey, of Port Dundas, on the outskirts of Glasgow. There are here several distilleries, Mr. Harvey's among the number, and the spent malt (draff) and spent liquor of the stills (pot ale) are good cow food. There has thus gradually grown up in this locality under Mr. Harvey's energetic management one of the largest dairies in the kingdom—probably in the world. Cow byres some 56 yards long, and from 12 to 24 feet wide, according as one or two rows of cows are to be accommodated, stand closely packed, the whole surface of the ground being thus covered by a roof. And from 900 to 1,000 cows are pretty constantly in milk. They are fed during winter partly on steamed turnips, 7 tons being steamed daily in order to give one meal daily to 900 cows; also on coarse hay, of which, as of straw, they get between 20 and 30 lbs. a-day a-piece; also on draff, of which they receive half a bushel daily each; also on Indian corn meal, of which they have 3 lbs. daily each; also on pot ale, of which they receive three times a-day nearly as much as they will take—*i.e.* from 6 to 10 gallons daily. During the summer they are let out, a byre full at a time, for half a day to grass, and coming in receive their spent malt and still-liquor and hay in addition. They are managed, cleaned, and fed by two men to a byre holding about 100 cows; the milking is done three times a-day by women, who take charge of thirteen cows in full milk, or double that number in half milk, a-piece. Between four and five (taking the winter management) the byres are cleaned out, and the cows receive a 'big shovelful' of draff a-piece, and half their steamed turnips and meal, and a 'half stoupful,' probably 2 gallons, of pot-ale. They are also milked thus early. At seven they receive their fodder-straw or hay. At ten they get a 'full stoupful' (probably 3 or 4 gallons) of pot ale. They are milked at noon. At two p.m., or thereabouts, they are foddered again, and at four p.m. receive the same food as at the morning meal. They are again milked at five or six, cleaned out and left till morning. The loss by pleuro-pneumonia in so large an establishment, thickly housed together, has been very great. Mr. Harvey has, however, at length got rid of it by never going to market for cows. He buys yearlings, rears them on farms near Port Dundas; does not bring them into his byres until fully satisfied that they are free from all infection; keeps them for a couple of years, bringing them to the pail at three and three-and-a-half years old. They are chiefly Ayrshire and shorthorns, and being worth from £14 to £20 a-piece, an enormous capital is thus invested. Some 1,500 acres of land are held close by, and a large extent of grass land is watered from the byres. The whole waste of every kind of the establishment is pumped to a large wooden tank on the highest ground at hand, and thence by underground piping, extending in some instances for a mile and more, it is conveyed over about 500 acres of land. It is thus conveyed to one outlet in each field, and thence by pieces of metal piping fitting together; and by india-rubber hose at the end of this, it is conveyed over the whole surface of the field, receiving one good dressing at least twice a year. There are no means of giving an exact account of the resultant produce—for the fields are all grazed, every cow being turned out as we have said for half the day during the summer months. But Mr. Harvey is satisfied with this part of the large system, which, as a whole, proves profitable. As to the produce of the byre, under the management thus roughly described, it is stated never quite to have come up to 2 gallons per day throughout the year for the whole number of cows in milk. But being close on this it must be supposed equal to nearly one-half more than is obtained under ordinary management in the dairy districts of England."

These last remarks bring us to the subject of utensils. Much has been written and said as to the best material for milk dishes—wood, lead, tinned-iron, zinc, earthenware, and glass have all in turn been recommended, and all in turn condemned. Of these we unhesitatingly place wood as the worst, glass as the best, material; the only objection which can be made, and which alone has been made, to glass, is that it is somewhat expensive, not only in first cost, but because it is liable to be easily broken. Tinned-iron and earthenware seem, therefore, to be the best, and possibly of the two earthenware is the superior. If iron vessels lined with glass or with porcelain, after the manner of some cooking utensils, were introduced into dairy practice, we believe they would supply a want long felt. As a rule the dishes in which milk is kept for the cream to rise, are too deep. On this point Dr. Voelcker says, it is a great mistake to put up milk, for cream, in dishes as deep as 4 or 5 inches, which is the usual practice; the advantages they give by taking up less space, and costing less than a number of small pans, is more than counterbalanced by the loss sustained in the smaller quantity of cream thrown up. The following is a note or two on the subject of deep or shallow pans, taken from the *Homestead* :—

"In order to determine with certainty the results of setting milk for cream in deep or shallow pans, I have made several experiments, and, although on a small scale, they have been made with accuracy and care.

"The milk from two cows was mixed at each milking, strained into common-size pans, and allowed to stand forty-eight hours. At this time the cream became hard, and was skimmed off wholly free from milk. The milk had been measured in each pan when strained, and when skimmed the cream was measured and weighed, but I do not place full reliance upon the weight, as our common steelyards were used. Believing that temperature has effect on the milk, it was kept as equal as possible each day. No fire was kept in the room during the night, and I estimate the average temperature of the room at 46°. The temperature from nine A.M. to nine P.M. was 65°. The position of the pans was similar, being on the same shelf. The following is the result :—

In pans	containing	1 quart,	the cream	measured	1 gill.
Do.	do.	2 quarts	do.	do.	2 gills.
Do.	do.	3 do.	do.	do.	2½ do.
Do.	do.	4 do.	do.	do.	3 do.
Do.	do.	5 do.	do.	do.	3¾ do.

"The same experiments were tried twice successively with the same results. For another experiment the milk was allowed to stand seventy-two hours, but *without any addition* to the measure of cream. The question will readily occur, whether there would be any difference in the per-centage of *butter* in either of the above experiments. This I cannot say, but I am positive in my own mind it is in favour of the milk in *shallow pans.*

"I have experimented in various ways in the treatment of milk and butter-making, and have come to the following positive conclusions, viz.:—Milk should be strained immediately after milking, and that two quarts are sufficient for one pan. No more cream is obtained from milk which has been headed, than from that which has been kept in a room of the proper temperature. Cream should be kept at the same temperature after being skimmed as before, during cold weather; also it should be stirred twice a day, and a little salt stirred in two or three times while being gathered for a churning—this will prevent the white particles of curd seen in butter. Forty-eight hours is sufficient for the milk to stand before being skimmed, if proper treatment is pursued. For churning, the cream should be warmed gradually. This is, in my humble opinion, the best method of treating cream during the winter months; for summer my method is somewhat different."

CHAPTER IV.

MILK, CREAM, BUTTER, AND BUTTER-MAKING.

Before giving details on the making of butter, it will be well to glance briefly at the composition of 1,000 parts of milk. The following is an analysis by Hadlein as given by Johnston in his "Agricultural Chemistry":—

Butter	27 to 35
Casein (cheesy matter)	45 ,, 90
Milk-sugar	36 ,, 50
Chloride of potassium, and a little chloride of sodium	1¼ ,, 10
Phosphates, chiefly of lime	2¼ ,, 10
Other salts	6 ,, 10
Water	882¼ ,, 815

The following is an analysis of the solid matter, or inorganic constituents of milk, according to the same authority:—

Phosphate of lime	2·31
,, magnesia	0·42
,, peroxide of iron	0·97
Chloride of potassium	1·44
,, sodium	0·24
Free soda	0·42

Milk is composed of a great number of round globules of very minute size, of a fatty nature, which float in a thin fluid. The globules constitute the fats of butter, the fluid is made up of curd, or casein, albumen, milk-sugar, and various mineral matters; the globules above-named are enveloped in thin shells of curd. The following is an analysis of skim-milk, which is of denser nature, or possesses more specific gravity than unskimmed milk, in which the globules of fatty matter are present, and which necessarily reduce the specific gravity of the mass. The specific gravity of new milk on an average may be named at 1·030 to 1·032. If very rich in butter, it may sink to 1·029, or 1·028. The skim-milk analysed below had a specific gravity of 1·037 :—

Water	89·65
Butter (pure fat)	·79
Casein	3·01
Milk-sugar	5·72
Mineral matters (ash)	8·3
	100·00

Cream is lighter than milk, but heavier than water; the specific gravity of the sample of which the following is an analysis by Dr. Voelcker was 1·01094 :—

Water	74·46
Butter (pure fatty matter)	18·18
Casein[*]	2·69
Milk-sugar	4·08
Mineral matters (ash)	0·59
	100·00

The following is Professor Way's analysis of butter:—

Pure fat, or oil	82·70
Casein, or curd	2·45
Water, with a little salt	14·85

The following remarks on the composition of milk will here be useful :—

"'Milk, as is well known, is not a uniform white liquid, but a fluid, owing its opaque character to a number of little cream-globules. Seen under a microscope of no very great power, milk appears as a colourless fluid, in which there are floating innumerable little white globules, or small bags of fatty matter. The butter is encased in these microscopic bags, or cells, which themselves are composed of very much the same material as the curd of milk. These, being lighter than water, rise on standing, and are removed as cream. If it were possible to separate the cream completely by standing, the milk would be almost colourless; but, inasmuch as a certain number of milk-globules always remain suspended in milk, even after long standing, skimmed-milk is always more or less opaque. On allowing milk to become acid, which it does readily in warm weather, one of its constituents, which, from its sweet taste, is called sugar of milk, is converted, at least in part, into lactic acid. This lactic acid separates the next constituent of milk—the casein, or curd. Rennet separates it also. When this is removed, we obtain whey. Thus, the principal constituents of milk are water, curd or casein, butter, milk-sugar, and mineral matters.' The proportions of these, however, vary very considerably. In six varieties of new milk analysed by Professor Voelcker, between August 7 and November 29, 1860, he found in 100 parts:—

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[*] Containing nitrogen, ·43.

Water	from	83·90	to	90·70	parts.
Butter	,,	7·62	,,	1·79	,,
Casein	,,	3·31	,,	2·81	,,
Milk-sugar	,,	4·46	,,	4·04	,,
Mineral matter	,,	0·71	,,	0·66	,,
Per-centage of dry matters	,,	16·10	,,	9·30	,,

"The cow's milk analysed long since by the great Swedish chemist, Berzelius, was still poorer than any of those examined by Professor Voelcker. It is worth referring to, since Berzelius ascertained the portion of saline matters which the milk contained (Thomson's Chem., vol. iv. p. 501). In 1,000 parts of milk he found:—

Water	928·75
Curd, with a little cream	28·00
Sugar of milk	35·00
Muriate of potash	1·70
Phosphate of potash	0·25
Lactic acid, acetate of potash, with a trace of lactate ot iron	6·00
Earthy phosphates	0·30

As regards the quantity of milk yielded by cows, and the proportion of butter yielded by milk, the following, from the pen of Mr. Horsfall, will be useful:—

"On looking over the several treatises to which I have access, I find the following statistics on dairy produce. Mr. Morton, in his 'Cyclopædia of Agriculture,' p. 621, gives the results of the practice of a Mr. Young, an extensive dairy keeper in Scotland. The yield of milk per cow is stated at 680 gallons per year. He obtains from 16 quarts of milk 20 ounces of butter, or for the year, 227 lbs. per cow; from 1 gallon of cream 3 lbs. of butter, or 12 ounces per quart. Mr. Young is described as a high feeder. Linseed is his chief auxiliary food for milch cows. Professor Johnston ('Elements of Agricultural Chemistry') gives the proportion of butter from milk at 1½ ounce per quart, or from 16 quarts, 24 ounces, being the produce of four cows of different breeds, Alderney, Devon, and Ayrshire, on pasture, and in the height of the summer season. On other four cows of the Ayrshire breed he gives the proportion of butter from 16 quarts as 10 ounces, being 1 ounce per quart. These cows were likewise on pasture. The same author states the yield of butter as one-fourth of the weight of cream, or about 10 ounces per quart. Mr. Rawlinson (Journal of the Royal Agricultural Society, vol. xiii. p. 38) gives the produce of 20,110 quarts of milk churned by hand as 1,109 lbs. of butter, being at the rate of fully 14 ounces per 16 quarts of milk; and from 23,156 quarts of milk, 1,525 lbs. of butter, being from 16 quarts nearly 16⅔ ounces of butter. The same author states that the yield of butter derived from five churnings of 15 quarts of cream each, is somewhat less than 8 ounces per quart of cream. . . . . The average of butter from a cow in England is stated to be 8 ounces or 9 ounces per day, which, in a yield of 8 to 9 quarts, is 1 ounce per quart, or for 16 quarts, 16 ounces. The richest cream of which I find any record is that brought to the Royal Society's meetings during the month of July, for the churns which compete for the prize. On referring to the proceedings of several meetings, I find that 14 ounces per quart of cream is accounted a good yield."

Mr. Horsfall himself obtained as the average of several trials a yield from 24 to 27¼ ounces of butter from 16 quarts of milk. The popular or general estimate is, that 1 quart of cream is obtained from 12 quarts of milk, and 1 lb. of butter from the quart of cream. It is evident that such statements must only be taken as approximative, for the quantity yielded will not only depend upon the food and treatment of the cow, but on the treatment of the milk, or cream, in the *process of butter-making*, to which we now direct the attention of the reader.

Butter is made either from the *whole milk* as it is obtained from the cow, or from the *cream* which is taken from the milk after this is allowed to stand for a time. Opinion is divided as to which is the best of these two modes. Some maintain that the produce of butter is greater when the whole milk is churned, than when the cream alone is churned.

The following is a detail of some experiments undertaken by Professor Trail and Dr. Gerard, to ascertain the best condition in which the milk should be to obtain the highest per-centage of butter :—

"1. Sweet cream churned alone.
2. Sweet milk and its cream churned together.
3. Sour cream churned alone.
4. Sour milk and its cream churned together.
5. Scalded, or Devonshire cream churned alone."

"On the 24th of May, 1807, the milk of four cows was drawn in the same vessel, passed through a strainer, and then divided into five portions of six English pints each, which were placed in similar basins of earthenware, in a place the temperature of which ranged from 55° to 60° Fahr.

"Monday, 25th, the temperature of the air was very hot, 76°; but that of the milk-house, by constant evaporation of water, was kept about 60°.

"Tuesday, 26th, thirty-nine hours after the milk had been drawn from the cows, it was removed from below the cream of No. 1 and No. 3 by a syphon; the cream from No. 1 and the milk and cream from No. 2 were immediately churned in glass vessels.

"*No.* 1. *Sweet cream churned alone.*—From previous trials it was found that the addition of cold water to thick cream facilitated the separation of the butter: half-a-pint of water was added to the cream; the temperature of the mixture at the commencement of churning was 62°. In fifteen minutes butter appeared in grains; the churning was continued for twelve minutes longer, or twenty-seven minutes in all, when the temperature was found at 70°. The butter was collected, but from the warmth of the weather was very soft. It was put into cold water until next day, when it was worked and washed in the usual way, and weighed 1,386 grains. It was of a good colour, and perfectly well flavoured.

"*No.* 2. *Sweet milk and its cream churned together.*—The mixture of sweet milk and cream was churned at the same time; though cold water was added after one-and-a-half hour's churning, no butter was seen. The churning was continued three hours without obtaining butter.

"*No.* 3. *Sour cream churned alone.*—On Thursday, the 28th of May, the cream of No. 3, which had been separated on Tuesday, and placed in the milk-house, was now slightly acid, and was churned after half-a-pint of cold water had been added to it. In twelve minutes butter appeared, and in eight minutes more had united into one mass. During the churning the temperature of the cream had risen from 54° to 63°. The butter, when well washed and worked, weighed 1,756-5 grains; the colour and taste were very good.

"*No.* 4. *Sour milk and its cream churned together.*—On the same day, 28th May, the milk and cream which had become acid were churned together, and half-a-pint of cold water was added. It was full fifty-seven minutes before any butter appeared, and before the churning appeared to be completed one hour and fifty minutes had elapsed, showing clearly that more time is required to churn milk and cream together than to obtain the butter from cream alone. The butter was diffused in small grains, and when washed and worked as long as colour was communicated to the water, it weighed 1,968 grains; colour paler than the last, but of good flavour.

"*No.* 5. *Clouted cream churned alone.*—On Tuesday, the 26th, the milk and cream of No. 5 was placed in a vessel of warm water until the temperature of the milk rose to 156°, a Devonshire dairymaid assisting in the operation. The milk was drawn from below the cream by a syphon, the latter being kept cool until the following day, when it was churned.

"It was ascertained that by churning the milk of Nos. 1 and 3, a few more grains of butter could be obtained on some occasions, but on no occasion from No. 5, so completely does the scalding process separate the butyraceous matter from the milk. The butter from No. 5, when well worked and washed, weighed 1,998 grains. It had a rich yellow colour, and tasted agreeably.

"Similar experiments were repeated, the result of which was, that the largest amount of butter was produced by the Devonshire method; the next in quantity, by churning the milk and cream together when a little acescent; the third in quantity was afforded by cream kept till it was slightly sour. The smallest quantity was obtained from sweet cream; but on no occasion was butter obtained by churning sweet milk alone."

Churning of cream, although a mechanical process, is aided by chemical action, induced by allowing the cream to become sour before it is churned. The rationale of this is easily understood; for, by allowing the souring to take place, lactic acid is formed, which dissolves the shell, or entire envelope of curd, or casein, which, as we have already named, covers the globules of fat. These envelopes being removed, the globules are allowed to come together, and cohere by the operation of churning. The "coming" of the butter is aided by raising the temperature of the cream in winter, or lowering it in summer, to 60° Fahr., or thereabouts. The time varies in which the butter is obtained from ten minutes up to as many hours; and in some cases in cold weather it does not come at all, but froths up into a mass, which distracts the dairy maid, and renders her labour often useless.

From what we have said on the subject of the arrangement of the dairy, and its fittings and utensils, it is scarcely here necessary to say that cleanliness in every detail is of the utmost importance. The milk dishes must be clean, the churn scrupulously clean also, the butter dishes clean, and need we say the hands and person of the dairymaid herself.

In putting up milk which is to be churned to be soured, it is advisable so to proportion the size of the vessel to the quantity of milk to be put up, that it will be filled at once. If this cannot be done, by no means allow the interval between putting in the first and second supply to be so long as to allow the first supply to sour and thicken. If fresh milk is allowed to be mixed with milk which is already soured, bad-tasted butter will be the result. After the milk has soured, the cover which covered it from the air should be taken off, and the air allowed to have free access to it. It is difficult to say when the milk is precisely ready for churning. Experience soon enables the dairymaid to know from its appearance whether it is ready or not. Generally it should be allowed to stand thus for two or three days in winter; less will do in summer, according to the weather. If the weather is very cold, the churn may be warmed by filling it with boiling water, pouring it out, and thereafter putting in the milk. If this does not warm it sufficiently, add boiling water to the milk. In the summer the desire of the dairymaid is to get her milk cool enough. When put into the churn, a little cold water will aid the process. When cream is used for butter-making, it is stood up till ready for churning in proper vessels. When successive portions of new cream are added to the vessel, let the whole be carefully stirred up so as to incorporate the fresh with the old portions. Stirring the whole contents of the cream vessel is necessary from time to time. It is essential, however, to remember that a *clean* spoon or stirrer be used each time. Butter has often a bad taste given to it by allowing a thick skin to gather over the cream. This should be well mixed with the whole body; indeed, its prevention should be secured by frequent stirring of the mass.

The following remarks on the subject of butter-making we owe to a paper by Mr. Louis H. Ruegg, published in the Journal of the Royal Agricultural Society :—

" Butter-making is a process conducted in pretty much the same manner in every county, and an account of the operation as it is performed in Dorsetshire (whose butter holds the highest rank in the quotations of the London market), may serve for a general description. The cows are milked twice a-day : in summer in the fields, in winter generally in the straw barton. The milk is purified by being passed through a sieve, and then set up to cool in milk leads. In some counties glass ware or stone coolers are used ; but a Dorsetshire farmer will use nothing but *leads*, which he finds the cleanest, sweetest, and in every respect the best of milk coolers. In these the milk is allowed to stand for a period varying from twelve to thirty-six hours, according to the season, the quantity of milk at command, &c. Usually, after standing for twenty-four hours, it is skimmed, and the cream is collected in tin vessels until sufficient to form a 'churning' has accumulated. In very large dairies, and in the summer season, butter is made every day ; and it may be laid down as a general rule that the quicker cream is converted into butter, the sweeter and better the butter. It should not be allowed to remain longer than three days under any circumstances. The churn having been prepared by rinsing with hot water in winter and with cold water in summer, the cream is agitated until a complete separation of the fatty matter from the milky fluid has been effected. This operation is a most uncertain one ; its duration varying from ten minutes to twelve and even twenty-four hours, according to the temperature, the quality of the cream, the state of the weather, the operation of the churn, and other circumstances. The butter having 'come' (to use the language of the dairymaid), the whey is drawn off for the pigs, and the butter is taken out and well washed. It is then worked with the hand until the butter-milk is thoroughly expressed and the air bubbles are broken. A portion of salt is mixed with about each half-dozen pounds; the manipulation is resumed, the lump undergoes a second washing, which carries off the surplus salt; and it is finally made up into rolls or printed pats for the home market, or, with an additional salting, is packed in clean tubs for the London factor.

"In Bucks milk is skimmed at the end of twelve hours, and this process is repeated at the end of twenty-four and thirty-six hours, and during the winter it is subjected to the skimmer a fourth and even a fifth time. In Devonshire, where much clouted cream is made, it has been attempted to increase the proportion of butter from cream by scalding the milk; but on this point Mr. Acland, in his Report on Somersetshire, furnishes some conclusive facts. Mr. Acland had 12 quarts of raw milk tested against as many of scalded milk, and it was found that not only was there loss by evaporation (as might have been expected), but that the quantity of cream and the weight of butter were less from the scalded than from the raw milk; and an analysis by Professor Way shows that the largest proportion of pure butter was found in the latter.

"The primal condition of excellence in butter-making is *purity*. Milk is in the highest degree susceptible of taint. Milk in the udder may be poisoned by the cow eating improper food. 'Milk,' says Dr. Taylor, in his work on Poisons, 'is rendered bitter when the cow feeds on wormwood or sow-thistle, and the leaves of the artichoke. Its taste is affected by the cabbage, the carrot, and all strong-smelling plants: and the effects extend to butter and cheese, and all articles of food prepared with milk.' Milk may even be poisoned without the cow being affected, in proof of which the same writer refers to the case of some inhabitants of a district in North America, where a disease called the cow sickness, symptoms of having been poisoned, and even death itself, were caused by the milk of cows fed on unwholesome herbage. With so sensitive a fluid, therefore, the utmost care is required, not simply as regards the milk itself, but also the food which the cow eats and drinks. Cows are sometimes permitted to drink from a barton pond which the drainings of liquid manure had made, to use a common expression, 'as black as a hat.' Others, again, are allowed to slake their thirst in the waters of stagnated ditches, or in ponds which have been slowly decomposing animal or vegetable refuse matter.

"If milk is so liable to be affected that it may be the medium of conveying poison through the cow, it follows that the quality of butter very materially depends upon the quality of the water which the cow drinks.

"The necessity of *cleanliness on the part of the dairymaid* is insisted on by every writer on this subject. The dairy vessels must be scrupulously clean; they and the dairy itself must be removed from everything that taints the air. The fumes of a stable, or the effluvia of a pig-sty or dung-heap (which are too frequently found in the vicinity of a dairy-house), injuriously affect the butter. If the cooler be made of zinc, a very serious effect indeed may be produced. 'It is probable,' says Dr. Taylor, 'that some of the lactate of zinc is here formed, as well as a combination of the oxide of iron, with casein. I have been informed that milk and cream which were allowed to stand in such vessels, have given rise to nausea and vomiting. This system would not be allowed under a proper system of police.' Even when the cream is safely 'boxed' it is not out of danger, for in the best churn the whey escapes through the spindle-hole, and the butter gets a metallic taint. In its next stage, if the hand of the dairymaid be moist or 'sweaty,' or recently washed with soap, the butter acquires a rancid taste; and though it may have reached the tub in safety, it frequently spoils from improper packing. In fine, from the time when its elements are first formed from the succulent grass of the field, until the time when it appears on the breakfast table, butter leads (so to speak) a most precarious existence, and its preservation depends almost entirely on the *trifling* but constant attentions which I have endeavoured to indicate."

The following directions for making good butter are from the pen of Mr. James Green, Westport, in Ireland, who has devoted much time and attention to the subject:—

1st. Cleanliness in every department.

2nd. Air, like cleanliness, is absolutely necessary.

3rd. In summer the cows should be kept as cool as circumstances will permit.

4th. Before milking cows should not be driven fast, and, if so, should not be milked in a hurry after being so driven.

5th. Great care should be taken to milk them clean, as neglect in this particular is injurious to cattle, and also to the production of butter.

6th. The cows should be milked regularly.

7th. The cow-houses should be kept regularly clean, and tolerably airy.

8th. Every farmer should endeavour to have a dairy neatly whitewashed, with a window either of wire or wicket work, of such size as to admit of sufficient air.

9th. The dairy should be regulated in size, &c., according to the requirements, having plank or other shelving on which to rest the milk vessels.

10th. The milk should be kept sixty hours at least before churning in winter; and fifty-eight to fifty in summer, as age in milk will cause a greater produce of butter.

11th. Each milking to be put in a pan or vessel, and churned according to age, as mixing with, or throwing warm milk or cream produces curds and whey; and, besides, not having a return of butter, renders the butter-milk almost useless.

12th. It were better to temper the milk a little before churning in winter than use much boiling water, as many do to excess, thereby spoiling milk and butter.

13th. The butter-milk to be decanted as soon as possible out of the churn, and put into butts especially made for that purpose—the churn scalded, scoured, cleaned, and put out to air, for, if left in the churn, the milk will create an acidity and taste, of which the wood is susceptible, and thereby become bad.

14th. The milk vessels should be good clean oak, earthenware, or zinc, without deal or other soft wood likely to generate bad taste or smell; immediately after use to be scalded, cleaned, and put out to air.

15th. If the vessels from any cause whatever should become foul, scald with black currant tops, meadow sweet, or hawthorn.

16th. The churn to be preferred should be the spring pole or lever working, and for small dairies the ordinary churn of good clean oak with gleaks, which are less laborious and more regular of motion than the hand dash.

17th. The butter when taken off should be put in a large dish, passed through two or more waters, washed with the hand until fully divested of all butter-milk; when free of milk, to be aired, salted, and made into squares or rolls of about 2 lbs. each, if for immediate sale, and packed if for crocks, cools, or firkins.

18th. Each churning to be salted by itself.

19th. The firkins should be clean oak, close stave, tastily made, air and pickle tight, and if quarter hoops of iron were used it were better.

20th. Fine salt only to be used with butter.

21st. Avoid smoke in every way, and be careful that neither dust nor soap come in contact with either your butter, butter dishes, or butter vessels.

22nd. Many are the advantages derived from dairy-keeping and butter-making, as the butter-milk alone would pay much of the expense of a farm in the rearing of pigs and calves.

23rd. In many parts the dairymaids sing some plaintive ditty during milking, which tranquillises the cow, and causes the milk to flow more abundantly.

Butter has often a bad taste given to it through various causes, turnips, especially the Swedish variety, being the principal. By far the best way we know of to prevent turnips from giving their flavour to the milk, is to refrain from feeding the cows with this root *before* the milking, and give them turnips after the milking is finished, so that some hours will elapse before the milk is taken from them. Saltpetre put into turnippy-tasted milk is said to get rid of the taste. A tablespoonful per gallon of milk of a solution of half an ounce of chloride of lime in a gallon of water, is also said to be a certain cure for bad-tasted milk.

CHAPTER V.

CHEESE-MAKING.

Cheese is produced from the curd either of cream, of the whole milk, or from skim milk, thus forming "cream," "whole milk," and "skim milk" cheeses. The curd may be obtained from the milk by mixing with it an acid substance which has the property of setting free the casein from the alkaline solvent which maintains it in solution. Curd can thus be produced either by adding an acid to the milk, or by allowing the milk itself to turn acid or sour: in either case the casein is set free, and forms curd. The material generally used is an artificial acid called *rennet,* which is obtained from steeping in water a portion of a calf's stomach which has been previously salted and dried. When this rennet is added to milk at a certain temperature curd is rapidly formed.

The curd thus made is in the next process of cheese-making cut up into small pieces by a small hand tool called a "curd cutter," or it is done by appropriate mechanical means more or less complicated. The cutting or breaking up of the curd causes the whey to separate from it. This liquid is then drawn off, leaving the curd in mass, which is thoroughly freed from the whey by being pressed by machine or by hand. The dried curd is then crumbled by the hand, placed in a cloth, and put into a mould, which gives the mass its circular form, and placed under strong pressure derived from a "cheese press." After being submitted to pressure for a proper time, it is taken out of the press, salted, turned, and subjected to the action of the press for a second time; thereafter removed, and put into a cheese-room along with others to "ripen," as the technical phrase goes.

Such may be taken as a popular description of the process of cheese-making; but as there are many varieties of cheese made, and almost each dairymaid has a peculiar mode of making the variety of the district, the practical details of cheese-making as practised in Great Britain involve a more elaborate description than would at first sight seem necessary. The varieties of cheese made are classified as follows:—"cream," "whole milk," and "skim milk." Cream cheeses are not largely made; whole milk are those chiefly made. Skim-milk cheeses, as their name, indeed, imports, are of the poorer class. Of cream cheeses the most celebrated are—Stilton, Cream Cheddar, Yorkshire Stilton, or Cotherstone. Of whole-milk cheeses the best are—Cheshire, Cheddar, Double Gloucester, and Wiltshire. Skim-milk cheeses are, as may be supposed, made in the dairies in which the better cheeses are made, and are known as Ordinary, Cheshire, Single Gloucester, &c. Dr. Voelcker, whose classification of cheeses we have followed—a classification, by the way, which has reference more to the kind of milk used than to the quality or value of the cheese produced—has given, in a valuable preface in the Journal of the Royal Agricultural Society, a series of analyses of different samples of different varieties of cheeses. From these we make up the following table:—

Constituents in 100 parts.	Stilton.	Yorkshire, Stilton, or Cotherstone.	Cheshire.	Cheddar.	Double Gloucester.	Single Gloucester.	Wiltshire.	Skim milk.
Water	32·18	38·28	32·59	30·32	32·44	28·10	34·44	27·68
Butter	37·36	30·89	32·51	35·53	30·17	33·68	28·71	30·80
Casein*	26·31	24·38	26·06	28·18	31·75	30·31	29·00	35·12
Milk-sugar, lactic acid, and extractive matters .	2·22	2·76	4·53	1·66	1·22	3·72	3·60	1·46
Mineral matters (ash)† .	3·93	5·51	4·31	4·31	4·42	4·19	4·25	4·94
	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00
* Containing nitrogen .	3 ·89	3·90	4·17	4·51	5·12	4·85	4·64	5·62
† „ common salt	·89	2·55	1·59	1·55	1·41	1·12	1·03	1·27

According as the process of cheese-making is carefully or carelessly performed, so is the poorness and richness of the whey. When carelessly performed, much of the fine curd rich in butter is passed off with the whey. Whey of this sort is therefore allowed to stand, to throw up its contained cream, from which butter is made. The following is an analysis of butter as made by Dr. Voelcker:—

Water	92·90
Butter (pure fat)	·18
Albuminous compounds*	·94
Milk, sugar, and lactic acid	5·30
Mineral matter (ash)	·68
	100·00

As the nature of the present treatise precludes us from giving many details of cheese-making as practised in various districts, we shall give here a general description of the practical process. The weight of cheese produced by a certain quantity of milk will obviously depend upon its richness. On an average, one gallon of milk will give a pound of cheese. As we have before stated, the milk to be curded must be of a certain temperature, varying from 70° to 80° Fahr. The milk thus requires to be heated, as the temperatures above named are considerably above the normal or natural temperature of milk. The heating should be carefully done, and a frequent use of the thermometer made. If the temperature is too low, the curd will be soft, and the whey will be separated with difficulty; if the temperature is too high, the curd will be hard and dry. Dr. Voelcker states that when a thin cheese is wanted, a temperature from 72° to 75° will be found a good one; if a thick cheese is wanted, the temperature of 80° to 84° will be better, the higher being that for winter, the lower for the summer season. The rennet is now added to the warmed milk, and also the colouring matter (annatto, if this is used), and the whole is allowed to stand till the curd is formed. The next process is the separating of the whey from the curd. This requires to be done with the greatest care; for if the separation is not complete, the flavour and look of the cheese will be spoiled. After the curd is broken up, ample time should be allowed the whey to drain off. The crumbling or breaking of the curd after the whey is separated from it should next be done, and this most carefully. The "curd mill," or curd-breaking machine, is considered by some to be a much more efficient means of preparing the curd than the hand. The great point to be aimed at is to have the curd uniformly broken, not too small nor too large. If too small, some of the portions pass off with the whey; if too large, they remain soft. The best way is to use a curd mill, or breaker, which produces curd of the proper size. When the curd is ready it is placed in the vat. This is made of wood, and has numerous holes in its periphery and in the bottom, through which the whey pressed out by the press is allowed to escape. Before putting the curd into the vat, a cloth is placed in it, in which the curd rests, and over which it is spread, so as to prevent the curd from passing out of the vat under the pressure. A circular board or a cross is then put over the top of the vat, and the pressure, by means of the screw-press, applied. The pressure should be applied gradually, and continued for a quarter of an hour or so. The curd should then be taken out and cut up into pieces, and placed again in the vat, putting the centre pieces astride, and *vice versa*. Pressure is applied a second time, and the process is repeated till the curd is sufficiently dry to be passed through the curding-mill;

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* Containing nitrogen, ·15.

the salt is at the same time added, and thoroughly incorporated with the curd. The whole is then placed in the vat, and pressure gradually applied. The cheese does not remain under the action of the press continuously, but it is taken out of the vat each day, a clean cloth placed round it—the position of the cheese in the vat being reversed—and this is done for six or seven days; after which it is taken up to the cheese room, care being taken to turn it carefully over from time to time so as to allow of its gradual and thorough ripening. It is needless here to say, in conclusion, that thorough cleanliness in every detail connected with cheese-making is essentially necessary.

The following, giving a description of the mode of making Cheddar and Gloucester cheese, will afford the reader a fair idea of the process as usually adopted in large dairies; for fuller information and details of other modes, he must consult larger works. The following, from the Journal of the Highland Society, is Mr. Macadam's description of his mode of making Cheddar cheese:—

"I make my cheese once a day. The evening's milk, as soon as it is drawn from the cows, is put into shallow tin boynes to cool. Next morning, this is put through a very fine wire sieve into the steeping tub, while the morning's milk is added as carried in from the byre. In May, and the four succeeding months, the milk put in this manner together, in the evenings and mornings, will generally have a temperature of about 80° Fahr. If it is not so high, a little of the evening's milk is warmed in boiling water, to raise the whole to the above temperature. After this the sour whey, annatto, and as much rennet as will coagulate the whole in an hour, are added, and well mixed.

"I generally put in about 4 or 5 quarts of very sour whey to every 140 gallons of milk. As soon as the curd is properly formed, I commence to break it with a hand-breaker, made of tin and wire, which is somewhat like a riddle, and having a wooden handle about 3 feet long affixed to the middle. When partially broken, the curd is allowed to subside a little. As much whey is then drawn off and heated as will bring the whole up to a temperature of 80°. After this breaking is resumed, and the temperature maintained by adding more heated whey.

"Nothing further is done for the next hour but to draw off and heat as much whey as will raise the temperature to 100°. At the ond of the hour a portion of the whey is run off, and the curd is very gently broken with a shovel-breaker.

"An assistant now gently pours as much heated whey as will once more raise the temperature to 100°. During the time the whey is pouring the whole is actively stirred, but afterwards more gently, till the curd has acquired proper firmness. I cannot say how long it may be necessary to stir. If too much acid is present, less time is required, and if too little acid, more is necessary. The time will vary according to these circumstances from twenty-five to forty minutes.

"When stirring is finished, the curd is left half-an-hour, and then the whey is all drawn off. One side of the tub is raised a little to allow this to take place more perfectly. The curd is then heaped up to the highest side of the tub, covered with a cloth, and left for half-an-hour. After this interval, it is cut into large slices, turned upside down, covered up, and left for another half-hour. Then it is torn into thin strips and spread on a cooler, on which it is allowed to lie for another half hour. After thus being turned upside down, it is left another half-hour longer.

"The curd is then vatted and put into the press, on which 28 lbs. are suspended for about twenty minutes Afterwards it is taken out, milled, and salted. Cheshire salt is used at the rate of 2 lbs. to the cwt. It is salted in the cooler, and if it is above the desired temperature, it is allowed to lie, perhaps for half-an-hour, and stirred up once or twice. Our dairy being very warm, I am unable to cool down the curd as low as I would wish before making it up.

"On referring to my diary, I find that not one of the cheeses I exhibited at Kilmarnock was below 68 lbs. when vatted. The cheese is made up between two and three o'clock, P.M., and a dry cloth put on it the same evening. What I make on Monday is carried to the cheese-room on Thursday. Each cheese only gets one dry cloth daily. The room is over the dwelling-house and dairy. Its temperature during summer ranges between 65° to 80°. The specimens of cheese I exhibited at Kilmarnock were not subjected to any artificial heat.

"I use an oak steeping-tub in preference to any other. All the implements and utensils are kept as sweet and clean as possible. The weight or pressure put upon the cheese is the same throughout the different stages of the manufacture."

The following is a description of the "old-fashioned' mode of making Gloucestershire cheeses, as given in the *Agricultural Gazette* :—

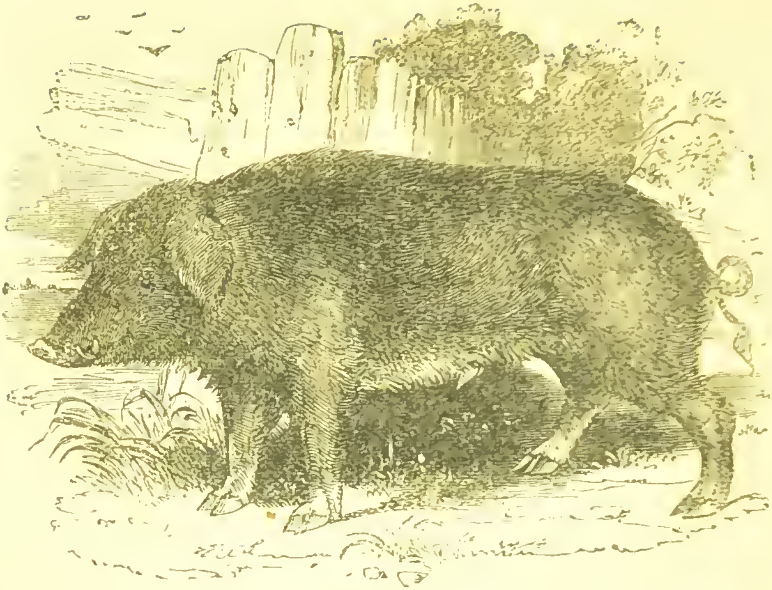
"An 80-gallon cheese tub is used for a dairy of 50 cows —making twice a day during summer, only once now (in the autumn). The milk at this season of the year is so much richer than in the height of the season, that as rich a cheese is made now as then, notwithstanding that the evening's milk is now skimmed before it is added to the morning's. About seven cheeses, sometimes more (eight to the cwt.), are made daily during summer. The number now is only four.

"The evening's milk is lightly skimmed; a portion is warmed and added with the rest to the morning's milk, raising the whole to about 80°. The rennet, prepared as in Mr. Hewitt's dairy, is added, enough to make it set in an hour. Then for half-an-hour it is slowly cut up and down with a framework of knives arranged sieve fashion and put at the end of a pole. After being thoroughly cut in this way, it is left to settle for twenty minutes, and the curd is then pushed on one side; part of the whey is baled out and the rest drawn off by a tap. The curd is then piled up and pressed by hand, cut into a few pieces and turned, put into vats and squeezed for ten minutes in the press; taken out again, cut open and into bits, and hot whey (85°) is poured over it. This has the effect of hardening the curd. It is not needed in the summer time, when it hardens naturally sufficiently, but now, and as winter approaches, it is required. The hot whey has not the effect which might be feared of dissolving the butter out of the curd—the whey which drips away from it is not the richer for this use of it—the only effect seems to be the firmer coagulation of the curd. And the thicker the cheese that is being made the greater the need of this scalding. Where 'Double Gloucester' cheese (four to the cwt.) is made, then the scalding is necessary, or the cheeses would not preserve their shape. The broken cheese is then squeezed together and allowed to lie for a bit in a heap in the bottom of the tub. It is then broken by hand into the vats placed one above the other, as already described. No salt is put with the curd here; but after an hour's pressing in the press, the cheese is taken out, wrapped in a dry cloth, and returned to the press, and in two hours it is again taken out, well covered with powdered salt, and returned to the press. In this way it has salt rubbed into it morning and evening, till the second evening, after which an interval of twenty-four hours is allowed; then the cloth is taken off, and it is salted and put naked into the press, and after the fourth day it is taken to the loft, where it is turned daily for fourteen days. It is then scraped, if necessary, and painted and turned occasionally for a month or more, after which it is ready for sale.

"Mr. Bennet uses annatto; a large tablespoonful to 70 gallons of milk is sufficient to give the colour that is desired. When in full work, about 15 to 20 lbs. of milk butter and 40 lbs. of whey butter are made from a dairy of fifty cows. The whey stands 6 inches deep in leads for thirty-six hours before being skimmed; what milk is allowed to yield cream for butter, stands only twelve hours before skimming. The whey of fifty cows keeps twenty pigs feeding, and several sets are thus fattened in the course of the season."

The following practical conclusions, which have resulted from the investigations made by Dr. Voelcker, on the subject of cheese-making, are given in the paper by him published in the Journal of the Royal Agricultural Society:—

"The first point to be observed is, that cheese is often spoiled (to use an Irishism) before it is made—that is, before it is separated from the milk; in other words, the milk is spoiled, then the cheese is spoiled during the making, and also in the keeping. Again, I have learned that richer cheese may be made on some land, even when a portion of cream has been taken from the milk, than on other land where the whole milk is used. 3rd. I concur with our best and most intelligent cheese-makers in the opinion that good, saleable, though perhaps not very fine flavoured, can be made on any description of land, provided care and attention are paid to the management of the milk at the beginning, to the treatment of the cheese in the tub, and to its after ripening. 4th. From all I could learn practically, and from what I have seen with my own eyes, I have come to the conclusion that bones improve the quality of the pasture and the richness of the milk, but also that more care is required to make cheese from boned pasture than on poor land. 5th. The flavour of the different kinds of cheese, such as Cheddar, Stilton, Cheshire, and others, is much more dependent on the method in ordinary use in these different counties than on the quality of the pasture, although the latter exercises a considerable influence. The inferiority of the Boothy cheese, made from dry food, to that produced when the cows are at grass, is well known. Nevertheless, admitting that food does much affect the flavour of cheese, I still am of opinion that the various practical manipulations exercise a yet higher influence in this respect. 6th. Each system of cheese-making, whether that of Gloucestershire or Somersetshire, appears to have its peculiar excellencies, but also its peculiar defects. 7th. Matters altogether indifferent are frequently insisted upon as essential to success, whilst others of the greatest importance are either neglected altogether, or much undervalued. Unless, therefore, a person thoroughly understands the grounds of his selection and preference, it is better to adopt one empiric method than to attempt to combine the different plans. 8th. I found good makers of cheese who had never heard a word about chemistry. 9th. Although much mystery is thrown around this art, all that is mysterious about it is purely accidental. The process in itself is very simple, and accords well with scientific principles so far as these have been ascertained; but skilful management is, perhaps, rather the exception than the rule. 10th. Even good practice may be considerably improved, or, more correctly speaking, simplified, by the application of scientific principles to cheese-making"



BOAR.

DIVISION SECOND.—THE SWINE.

CHAPTER I.

VARIOUS BREEDS OF SWINE.

THE most esteemed breed of England is the *Berkshire*. The usual colour of animals of this breed is black, or a dull brown, or black and white. They feed quickly, attain to a great weight, and are useful either as pork or bacon. The *Chinese* breed (Fig. 1), has been largely imported into this country, and has been much used for crossing with other breeds.

The *Hampshire* (Fig. 2) are chiefly met with now in South Hants. They have been so repeatedly crossed with other breeds, that much of their distinctive pecu-

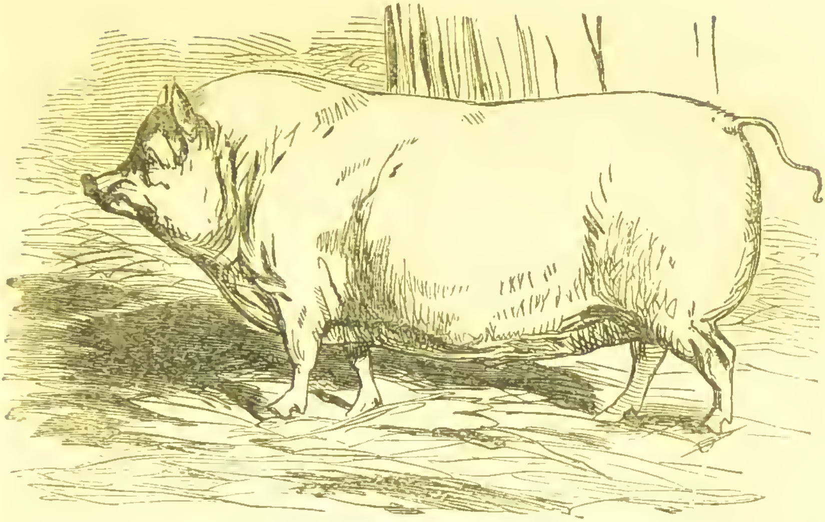


Fig. 1. CHINESE PIG.

liarities have been lost. Fig. 2 shows an improved Hampshire.

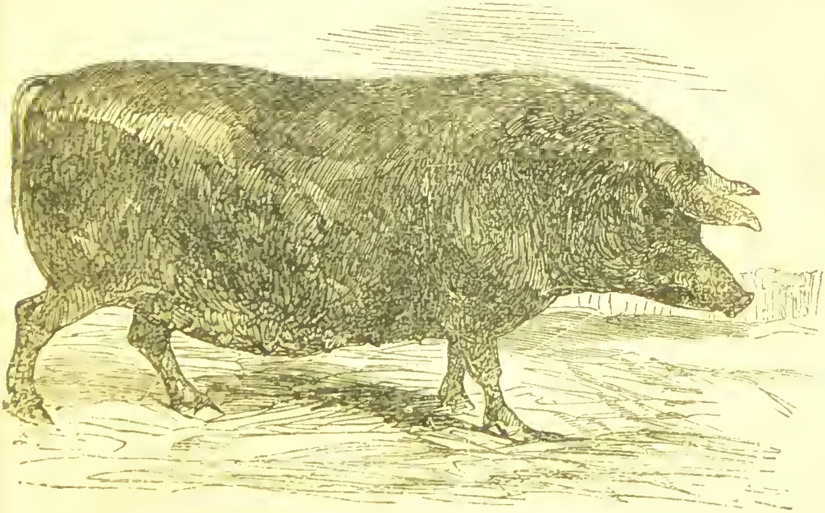


Fig. 2. IMPROVED HAMPSHIRE HOG.

The *Essex* breed (Fig. 3) is highly esteemed. The pigs of this breed possess fine form, and excellent flesh.

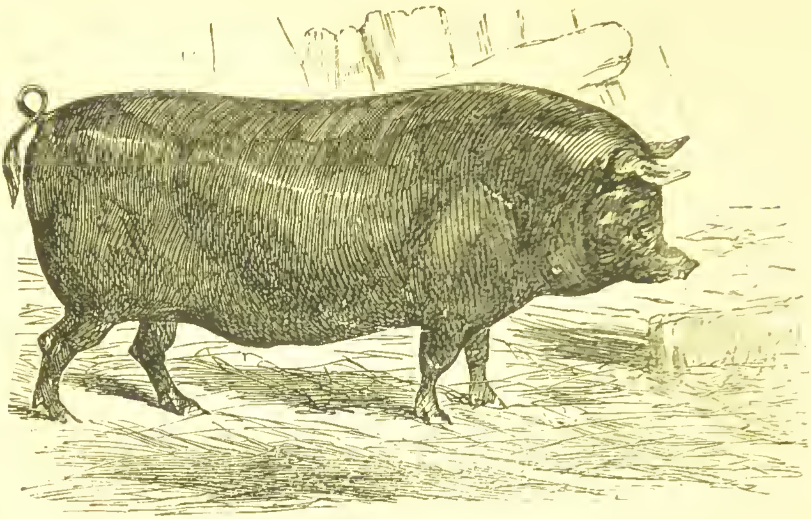


Fig. 3. ESSEX PIG.

The *Sussex* breed gives often good animals, which fatten quickly. Good crosses have been obtained with the Chinese.

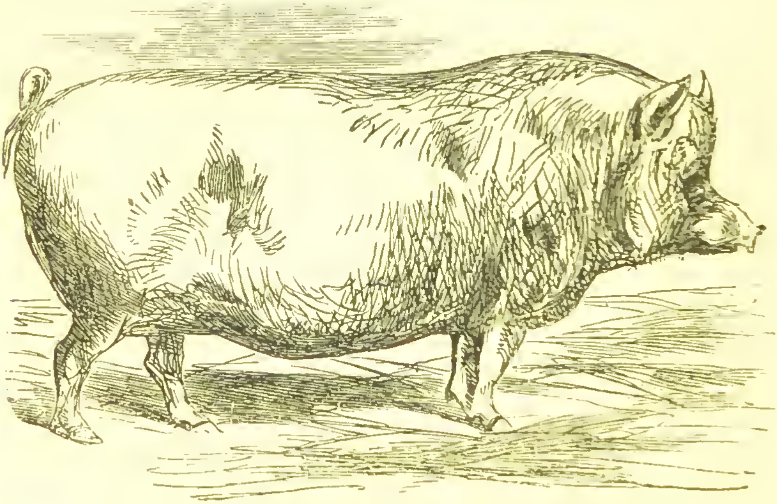


Fig. 4. IMPROVED SUFFOLK PIG.

The *Norfolk* breed yields animals which are small in size, but afford good pork.

The *Suffolk* breed (Fig. 4) resemble the Norfolk, in being of small size, and affording choice pork. Suffolk and Norfolk pigs are slaughtered annually in great numbers to supply the metropolitan market. Fig. 4 illustrates an improved Suffolk. The Neapolitan pig has been used largely to cross with our native breeds.

These are the principal breeds, but almost every county has its own esteemed variety. Generally the breeds of pigs are divided into two classes, the "large" and the "small;" the large being kept when "bacon" is the object, the small where the "pork" and "hams" are cured, and where quality rather than bulk or weight is desiderated. The "Windsor breed," a white pig, introduced by the late Prince Consort, is that which gives the peculiarities of both breeds—the aptitude of the small breed to fatten quickly, and of the large to produce large flitches of bacon. Another great advantage of the breed is that they fatten quickly, and will even thrive upon food of inferior quality.

All our English breeds of good quality may be said to be the result of crossing between the Chinese and Neapolitan pigs, and the old original English pig. The characteristic peculiarities of a pig indicate at once the influence of the cross. The large coarse pig partakes more of the character of the English pig. The small pig with a tendency to fatten quickly has more of that of the Chinese or Neapolitan. On the choice of a pig for farming purposes, Professor Tanner has the following:—"A farmer has many points to consider before deciding what class of pig to keep. If he has a large dairy, he will very likely find it most profitable to consume the waste by sows so bred and kept as to produce small-sized porkers, which may be got ready for market by the aid of corn. It is now an accepted fact that dairy waste is more profitably consumed when corn is supplied with it. So much is this the case, that it *is usual* in the west of England, when a dairy of cows is underlet, to cultivate for the dairyman some land on which he may grow barley for this purpose. It is probable that for such purposes a large, rather coarse, and good breeding sow, crossed with *the finest description of boar*, will produce the largest farrows of the most profitable pigs; and that upon those farms where dairies are kept, the first two classes of pigs will be produced most economically, and of the best quality. Some dairymen adopt another plan. Instead of using corn with the waste so as to produce porkers, they keep the young pigs as stores, and sell them when worth about £1. This is considered by many to be making the best of their pigs; but by those who attach due importance to the proper management of dung, a different opinion is entertained. If a farmer grows corn for his pigs, and they produce just enough to repay him for the corn eaten, and he allows the manure to be wasted by negligent management, then it may be admitted he has gained nothing, but lost his labour as a producer of the manure, and in such a case he may find it more advantageous to sell his young pigs as stores; but as soon as he takes proper care of his manure, we may look with confidence to his ultimately realising an indirect profit from giving his young pigs corn with the waste of the dairy."

CHAPTER II.

THE BREEDING, FEEDING, AND MANAGEMENT OF PIGS.

The sow is capable of having the boar at eight or nine months old; but the opinion of some of the best breeders is decidedly antagonistic to the practice of having the sow with pig at so early an age. The sow goes with young for a period between 109 and 143 days. It is usually calculated from sixteen to seventeen weeks. The sow does not attain its full growth till five or six years of age, and even after the latter period it sometimes keeps growing. It is, therefore, the better way to allow the sow to be eighteen or twenty months old before she is admitted to the boar. Attention should be paid to the points of the animal from which the farmer is to breed, both as regards the boar and the sow. The head should be small, the snout short, chops broad and wide. The ears should be small and thin, with sharp ends, and projecting forwards a little to the front. The neck should rise well behind the ears. The chest should be broad and deep, the ribs, or barrel, round and full, so as to give a broad back; the body long, but the legs short; the back straight from neck to rump, if curved only slightly so; the haunch, or the thigh, should drop almost to the hock; the hams and shoulders should be thick; the tail to be small and curled, and the bones small. A long-snouted, long-legged, and arch-backed pig should be carefully avoided, as it will consume a vast quantity of food, and never fatten kindly or quickly.

Two farrows, or litters, may be taken from the sow each year; the first produced at the end of March, or the beginning of April; the second in September or October.

Care should be taken to feed the sow while with pig judiciously, so that she may be in good condition, but not fat. The sow may be kept with the other breeding pigs up to the end of the second month after she is with pig; but she should after that time be kept quiet, and for about a week or ten days before farrowing she should be put in a sty by herself, and supplied with an abundance of good litter. As the sow is very apt to lie on her young, and sometimes, indeed, to devour them, it is requisite to watch her with great care. Mr. Stearn, a well-known authority on the breeding and rearing of pigs, has the following valuable remarks on the management of sows at the period of their farrowing. He says:—"My plan is to have a man with her to attend to her; for it is absurd to have all the trouble and expense of keeping a sow, then at the most particular time to leave her alone to take her chance. In my idea there is not sufficient attention paid to the construction of piggeries. I have seldom seen one which I did not consider too small, except, perhaps, just for fat pigs, which, of course, does not so much signify, for the less a pig put up for fatting moves the better. But the farrowing pen ought to be large, to allow the sow plenty of room, and likewise to admit of rails being placed round the sides, so fixed as to prevent the sow lying on the young ones. These rails should be made to shift according to the size of the sow, I think in height from 8 to 12 inches, and extend out from the wall, about 9 inches, having the supports carried up sloping from the side, instead of straight up from the floor; then when the sow lies down there will be no likelihood of her squeezing the pigs, as there is plenty of space left for her to pass between her and the wall, for nine times out of ten that is where the mischief is done, as sows invariably like to lean against something when they lie down. I have recently had a hundred pigs, without losing one from being crushed. Each place ought to be at least from 8 to 10 feet square, and the best floor, I consider, is asphalte. No damp or scent can rise from that. I tried boards, bricks, and almost everything in the way of floors. Most persons would say boards are best, but I think I can convince you to the contrary. If you will consider for only one minute, they cannot be healthy; for if the boards are placed close, of course the moisture will stand, and the boards become saturated; and if a space is left, the refuse litter will go between, so it will become one mass of putrid matter underneath, quite level with the floor, whatever the depth may be; for what passes through will absorb the urine, and is likely to bring on many diseases. But I think it is well in the cold weather to lay down a false lattice floor on the asphalte, so that it can be taken up once a week, and everything swept from under, for two or three weeks, when the pigs are very young. I have the beds attended to and fresh littered every morning, for I find the cleaner the place is kept, the better the pigs thrive. The floor being washed once or twice a week, everything runs off, and the asphalte dries in a very short time. There is another great advantage: it does not take more than two-thirds the straw it requires for any other floor; for the moisture appears to run under the litter, without wetting it so much, as it is laid a little on the slope. What is taken from the inside serves as litter for the outside, which ought to be paved in some way to prevent the pigs from rooting. By following this plan, the manure is made very regular and good. A tank should be made just outside to receive the drainage from the pounds, the building to be troughed to take off the rain water, to prevent the manure being washed. The pens ought to be so constructed as to be closed up in cold weather, and well ventilated in warm. At the time of farrowing I allow a very small quantity of litter cut short, and have a hamper placed in the pen, with a little straw at the bottom, and also an old blanket. I put a slip of partition about 2½ feet high across the pen to prevent the sow getting to the hamper. As the pigs come forth, put them into it and cover them up, until the sow has done farrowing, after which put them to her, and let them suck. When done, put them back in the hamper, give the sow a little warm milk and bran; and while she is eating this, have the bed attended to, by removing all the wet straw, &c. Add a little fresh litter cut short, then when the sow lies down, let the pigs go to her again. By pursuing this plan there is very little danger of losing them, for I believe one-third are lost for the want of proper attention. I always give the man 6*d.* per head for all the pigs he can bring up to a fortnight old. I find this much the cheapest plan, for then there is no fear but he will see to them properly, and attend to them, in the first instance, as well in the night as the day."

We have alluded to the revolting habit which the sow sometimes has of devouring her young. Mr. Stearn, who is evidently a close observer of the habits of the animals he rears, explains in the paper from which the above is quoted, what he thinks the reason of this is. He says, "How often do we hear people complain of the sow eating her own young? Therefore steps ought to be taken to prevent her doing so; for when once a sow does that she is of very little use for breeding purposes. If you will allow me, I will explain what I have found to be the cause. In some litters, the side teeth are much longer and sharper than in others; when this is the case, and the pigs begin to suck, they bite and scratch the paps, and punish and irritate the sow to such a degree, that it brings on inflammation, and the sow becoming mad with rage, she throws some one way and some another. At last she bites them, and if she once draws blood, she will begin to eat them. Now the way to prevent this: when the pigs are a few hours old, I have them taken away in the hamper, so the sow cannot hear them, and nip those teeth out with a pair of pincers. I should have lost a lot of thirteen some time since, if I had not pursued this plan, for the sow was as near mad as possible, threw the pigs all over the place, and I had great difficulty in taking them away, for she would not allow any one to approach her. As soon as I had drawn the teeth, and put the pigs back, she was as kind to them as possible, and perfectly docile. I think about eight weeks old is a good time for weaning the pigs, and I like to have them operated upon a short time previous."

The feeding of the sow immediately before farrowing is a point of some importance; it should be calculated to increase the flow of her milk, and to make parturition as easy as possible, although, with reference to the latter point, it may be named here that the parturition of pigs is generally very easily got through with, assistance being rarely required. The food, then, at this period, should be moist and nutritious—as whey and bran, and the like; this may be continued for a short time after farrowing, say two or three days, but after this she may be put upon her usual food.

The following, on the feeding of breeding pigs, will be useful here:—

"It is a question frequently presented—how can breeding sows be most economically kept? Doubtless this is a most important question, as breeding sows consume an immense amount of food; and unless they receive something that is inexpensive, and yet healthy for breeding, they can scarcely pay for keeping as breeders. We knew a case in which twenty sows, mostly of the Windsor breed, were kept, which received nothing but mangolds from October until the following harvest, besides what they could pick about the yards, except when they were nursing pigs. During the harvest weeks they went regularly into the stubble-fields with the young growing pigs, and earned their own living by picking up the scattered ears of corn which the gleaners had overlooked. When they were nursing pigs they received a little wheat ground into meal. The refuse wheat produced on the farm, and which was quite unsaleable, was reserved for this purpose; and this was all the food these sows ever received. They continued perfectly healthy, brought up two good litters of pigs every year, and we understood that for four years only one sow had cast her pigs. It is scarcely possible to conceive of a cheaper way of keeping sows than this. For about twelve or fourteen weeks in the year they would be nursing pigs, and for about ten they would be in the stubble-fields, the remaining twenty-eight or thirty weeks they would be living upon mangolds entirely. No valuable or expensive food is ever consumed by them. Even the wheat-meal they have is not worth more than 1*s*. per stone, at the present price of corn, and could not possibly be sold in the market.

"Under this system of management we consider that sows can be advantageously kept, and will generally return a fair profit for the food they consume. We know of no cheaper way of keeping them, nor of any system of feeding which promotes more general thriftiness and good health. We have seen them kept more expensively, but without more satisfactory results, and consequently with less profit to the breeder. Indeed, as we have already intimated, the great question of profit or loss depends mainly upon the economy or costliness of feeding rather than upon any peculiarity of breed."

The feeding of the pigs requires to be done with judgment and care, for upon the mode in which it is carried out depends the value of the grown-up animals. What we have said on letting down, or never getting up the condition of calves and lambs, applies with equal force to pigs. When female pigs are kept to breed from, care should be taken to see that each pig selected has its full supply of teats; this is necessary, as it is found that each pig in being nursed selects and keeps a teat for itself. Twelve teats should be the least number a breeding sow should have, a litter of this number of pigs being brought up with more economy than one of a greater number. Castration of the male pigs which are not intended for breeding purposes is essentially necessary, as, if this is not done, the pork would have a strong flavour imparted to it; the operation should be performed at the age of five or six weeks. Sows not kept for breeding purposes are sometimes spayed.

The young pigs should be gradually accustomed to solid or their ordinary food; bruised oats and bran, made into a soft mash, may be thrown into the trough. It is a maxim with some first-rate breeders, that for the first six months of its existence, the pig can scarcely be fed too well; but that after this age, and up to the age of fifteen or eighteen months, it should be kept merely in a growing condition, acquiring strength, and storing up blood, and flesh, and muscle. Pigs, between the period just named, may be fed with economy, and with ultimately profitable results, by having a run of good grass, and, after the grass fails, with turnips or mangolds in the winter. Pulped mangolds and barley-meal have been used with great success for feeding pigs. Pigs are specially fond of sour or fermented food, and *salt* is of essential importance to them. Cinders or small pieces of coal are also devoured with eagerness by pigs, and indeed seem essential to them.

"Pigs," says Mr. Falk, "stand just as much in need of salt as any other of our domestic animals, and nothing will make them take more kindly to their food than a moderate quantity of salt mixed with the meal, wash, potatoes, &c., they get, and if their troughs are now and then rubbed with salt, there never will be any food left behind. Alderman Mechi, keeping at least 120 pigs in his yard, did not lose one in six months by giving them salt freely, and applying it moreover also in the corners where the pigs dung, as a means of purifying the stys. The farm-yard *poultry*, geese, ducks, and pigeons, will thrive all the better for having a little salt mixed regularly with their food, and will be much less liable to diseases, and lay more freely, for their blood requires even more salt than animals. They often find much difficulty in procuring the necessary salt out of the dung and offal when free to wander about, and when they are put up for fattening they have of course no chance to do so. Salting the potatoes, meal, &c., in the same manner as one would do for human beings, will shorten considerably the time they require for fattening."

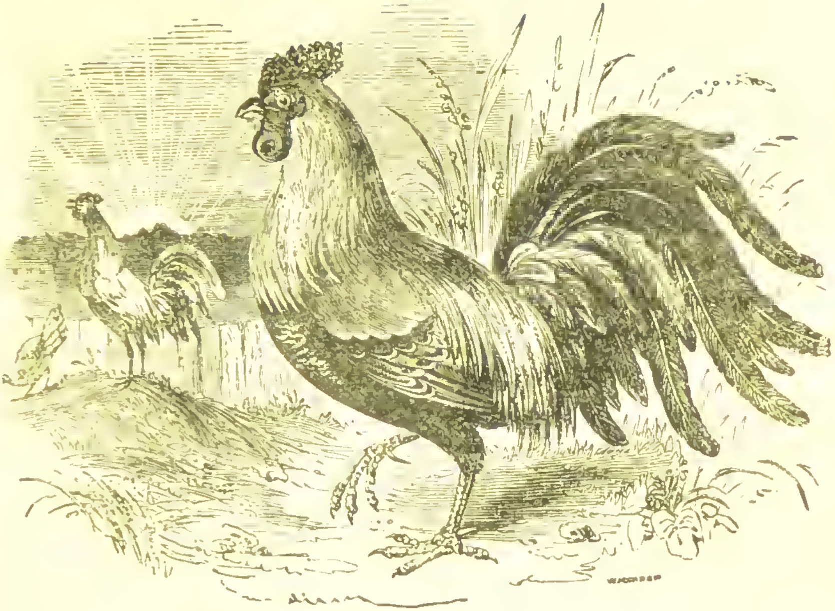
The pig having thus been got into a good healthy condition, the fattening of it is the next part to be attended to. The following remarks, from a paper by Professor Tanner, will be useful on this point:—"To give a *poor* pig strong fattening food, must for a time be attended by loss. The system is unaccustomed to rich food, and cannot appropriate it, because (as shown in previous papers) it has no fat cells ready to receive it. These will be produced by food of moderately good quality, after which the pig might have stronger food, and would be able to make good use of it. When meal is given to pigs for the purpose of fattening them, its *liberal* use is most economical. It should be supplied three times daily, at regular intervals, and should be given as a thick paste. The feeder should give them as much at each meal as they can eat, and should any remain in the trough, it should be shut off from the pigs by a movable flap, in which case they receive it with their next meal; but the careful feeder will soon know what they can manage to consume. After feeding, they should be kept as quiet as possible, for the more they sleep the more progress they will make. It is a sure sign that they are not paying when fatting pigs are seen wandering about the sty; the sooner they are made lazy, the sooner they begin to pay. Our improved breeds have a great aptitude for fattening, but this tendency is regulated by the same principles that operate in all other stock."

The following, from Mr. Rowlandson's paper, in the Journal of the Royal Agricultural Society, on the breeding and management of pigs, will usefully conclude this chapter:—

"Feed regularly, as abundance of food will not make up for the loss arising from irregular feeding. Pigs know their feeding-time very accurately, and nothing retards their feeding so much as allowing them to be pining and weazening for their anticipated regular meal. Also mix a little salt with their food. Keep the troughs and animals clean, their stys and beds dry and warm. Vary the bill of fare; in doing so, however, be careful not to lower the general standard of the diet; hogs do much better when their food is varied. Stores, breed-sows, and feeding hogs, should all be fed separately: two hogs will fatten better in company than separately.

"Hogs do better on cooked food than raw food. Some instructive experiments on this point are recorded in the Highland Transactions. I have seen some hogs of the improved large Irish breed fed to very great weights on *raw potatoes alone*—the flesh good and firm; these are, however, rare instances.

"When the sow is suckling, she should have extra food—oatmeal, milk, and potatoes; or pea-meal, potatoes, and milk, are the best. At the time of farrowing she should be carefully watched, and the young ones carefully removed; the placenta, or after-birth, ought also to be removed, otherwise she will devour it, and thus engender a morbid appetite, which may eventually cause her to devour her young. Abortion seldom takes place with the sow; the symptoms of such are similar to those of approaching parturition, but more intense. When this is likely to take place, a veterinary surgeon, if within call, should be requested to attend. As a general rule, a sow ought not to be allowed to breed after she has entered her fifth year, and boars after the seventh."



DIVISION THIRD—POULTRY.

CHAPTER I.

VARIETIES OR BREEDS, AND FEEDING.

Poultry is a kind of stock—if, indeed, this dignified name can be applied to them—not by any means popular amongst farmers; yet there is no doubt whatever that they will pay as well, and possibly better, than other stock, if the same attention is paid to them. Generally, however, poultry are suffered simply to exist on a farm with a view to obtain supplies for the table; they are rarely brought into the circle, so to speak, of farm operations, with a view to breeding, rearing, and fattening them for general sale. And yet such considerations as the following, copied from a well-known periodical, are worthy of the notice of farmers

"What a fact it is that we have not only not eggs enough for the very limited use we make of them in our cookery, but are importing them to the value of half a million pounds sterling per annum! In the last table of imports the number for 1861 stands as 203,313,300. I do not forget that eggs are largely used for our manufactures; but that does not affect the question why they are not produced at home. Upwards of 200,000,000 of eggs are produced for us by foreigners, while Englishwomen are wanting employment at home. Surely this is a mistake which must soon be rectified. The thing is, we have not studied the art of poultry-rearing as foreigners have, and as we ought to have done long ago. Even at this day I am occasionally asked whether I believe in the possibility of regularly inducing hens to lay all the year round, and even whether it is possible to obtain a succession of eggs through the four seasons. Such points should not be left for foreigners to answer at this time of day."

It is, however, gratifying to know that much more attention is being paid to the subject, and that, in the words of our authority, "poultry is assuming that position in the agricultural world which its importance demands."

The following note on the varieties of breeds, from the pages of the *Scottish Farmer,* will convey to the reader all that is necessary to be given in a treatise like the present, which does not lay claim to be considered other than as giving a mere outline of the various departments of modern farming:—

"1. The *Whiteface Black Spanish* fowls, as laying the greatest number of pounds of eggs. The Spanish hens are notorious for abundant layers of very large-sized eggs, weighing from two and a half to three ounces each. They require warm housing and abundance of good clean water, &c.

"2. The *Black Poland*, with a white top-knot. The Polish fowls are prolific of rather large-sized eggs, and are slow to sit—in fact, rare incubators. Hens of this variety have been known to lay from 200 to 250 eggs in a year. Chickens rather delicate and difficult to rear.

"3. The *Hamburgh* fowls. All the Hamburgh fowls are distinguished as great layers of middling-sized eggs, but rich in quality, and, like all great laying fowls, poor incubators; indeed, mostly everlasting layers; they are great favourites of those who require an abundance of eggs rather than frequent broods of chickens.

"4. The *Crested Hamburghs*, like the foregoing, are great layers of rich, good-flavoured, medium-sized eggs. Non-sitters—never knew one that wanted to sit.

"5. The *Game* fowls are next in order as good layers of rather small-sized, delicious eggs, excellent mothers and rearers of chickens, good for the table. Hardy, and great foragers. Are preferred by some to all other breeds.

"6. The *Bolton Greys* are esteemed prolific layers of medium-sized eggs of good quality; poor sitters; indeed, mostly what are called 'every-day' layers, but less invariably so than some other breeds.

"7. The *Dominique*. This well-known fowl, taken 'all in all,' is generally considered one of the very best we have, being pronounced good layers, good sitters, good mothers, and eggs and flesh of first quality.

"8. The *Dorkings* are moderate layers of large and well-flavoured eggs; sit steady, and are excellent mothers, rather delicate in constitution, chickens not easy to rear. They are to be ranked among the largest of fowls, and are esteemed the best in quality of flesh.

"9. *Brahmas* and *Cochins.* These fowls are more noted for early than abundant layers. Eggs of good quality, averaging about two ounces each—rather small in proportion to the size of the breed—good mothers, chickens strong, grow rapidly with good feeding, fit for the table at four months old, not after, until they arrive at maturity. As has often been said, they are *early* and *excellent* layers, and arrive at maturity earlier than any other large breed. By the term 'maturity' is meant the age at which a pullet will commence laying, and thus perpetuate its race.

"10. The *Guinea Fowl* is prolific of eggs, small, but with very hard shells; and on that account can be transported any distance with safety. The young Guinea fowl is delicate eating, the flesh little inferior to our partridge, and is in season when chickens and Prairie hens are scarce—in March."

Mr. Trotter in his Prize Essay in the Journal of the Royal Agricultural Society, on the "Rearing and Management of Poultry," gives the following note on an important point, namely, the—

"*Limit of Numbers of Poultry in proportion to the size of the Farm.*—To what better purpose can a farmer apply a great part of his produce (especially at present prices) than in feeding poultry?

"From calculations I have made of the value and quantity of food consumed, and the number of eggs laid by fowls of the Dutch every-day-laying variety, I am enabled to state that a profit of 150 per cent. may be realised. With such a startling fact before us, could I recommend the limiting of the number of fowls (of this breed) in proportion to the size of the farm?

"I am of opinion, if some part of the oat and barley crop which is carried to market was consumed on the farm by poultry, that it would be of great national benefit by not only increasing the profits of the farmer, but by increasing the fertility of the soil by a greater supply of manure. It is true the prices of poultry and eggs may be so reduced as to be unremunerative, but such prices I do not anticipate.

"Fowls are more profitable than turkeys, and the latter more than guinea fowls; the proportion of fowls should therefore be decidedly the greatest. In fact, were it not that one likes to see the farmyard stocked with every variety of poultry, I would recommend nothing but fowls and ducks.

"Geese, as a breeding stock, are only adapted to some situations. The turkey and guinea fowl, from the injury they do standing crops, are in some situations exceedingly troublesome.

"On an arable farm of two hundred acres there should not be fewer than one hundred fowls, and as many more as convenient, three turkeys, three guinea fowls, and twelve ducks, as a standing stock. After harvest, one hundred geese should be bought to put into the stubble fields.

"The following is the weekly consumption of food, and the average produce of eggs, of four hens of the Dutch every-day-laying variety:—

	s.	*d.*
1·4 gallon of barley, at 20s. per quarter	0	6
26 eggs, at 1s. per score	1	3·6
Profit		9·6

Being upwards of 150 per cent. The consumption of food in this case is very great, being 1½d. each per week. We are at present trying experiments with the

Spanish breed. We find that three hens and a cock consume in a week—

	d.
½ gallon of oats, at 14s. per quarter	1·3125
½ stone of barley meal, at 8d. per stone	4
	5·3125

Or rather more than 1¼d. per week. If the fowls had a free range we would calculate on keeping them on one-fourth of this amount."

In the rearing of poultry, there are several points to be attended to, of which we here give a rapid *resumé.* Where eggs are alone the produce wanted, one cock may be allowed to every twenty-four hens; if chickens for the table are desired, six to eight hens are the most which one cock should have to go with; some authorities give only three hens to one cock when the eggs are wanted for rearing chickens from. The eggs selected for hatching should be regular in shape, the one end being larger and rounder than the other. Various writers have described a mode of discovering by the peculiarities of the egg, its shape, or certain air-bubbles seen within it, the sex of the bird which it will produce; of this it may be said that it is considered to be more fanciful than correct. Mr. Trotter, however, it is right to state, says that he has "known great disappointment arise from the want of a knowledge of the discovery made by Columella," a Roman writer on agriculture, and of which this is a description. "Select," he says, "the round eggs, for they contain female birds, and reject the oblong shaped, for they contain birds of the opposite sex." Hens sit upon their eggs twenty-one days, and the chickens may be expected on the twenty-first or second. A very mistaken policy in some breeders is placing too many eggs under one hen. Thirteen seems to be the popular number, and this is ridiculously adhered to whether the hen be of small or of large size, whether she can cover them well or not. Size should regulate the point, not only the size of the hen which sits, but of the eggs upon which she has to sit. The Spanish hen lays large eggs, and nine of them have been recommended for a sitting. Where the eggs are small thirteen may be put under the hen. It is of essential importance to have a quiet breeding-place for the hen to hatch her eggs in. If annoyed by the other hens coming in and out, ten chances to one but she will only bring out a few of the number, and if the disturbance be great, but a small number of the eggs given to her. When the hen is put into a quiet place in which she will *voluntarily* settle—if not, the task of getting her to sit at all will be no trifling one—and she be well supplied with food placed near her, she will require no attention whatever, but will in all things attend to herself. The chickens do not always come out of the shell at the same time; it is therefore the habit of breeders to take away from the hen those chickens which come out first, and keep them in a warm place, in a basket or old hat lined with wool or flannel, until the whole brood has come out, when they are all given to the hen to bring up. Uniformity of coming out will, however, be secured if care be taken to have the eggs laid under the hen as nearly of the same age as possible, and that she has not too many, and that she be not disturbed during her sitting. As a rule, no assistance is required to bring the chickens out of the shell ; let nature have a chance to do her work, and in ninety-nine cases out of a hundred, she will do it well; at all events, where she fails, we fear that man will rarely succeed. Chickens do not require food during the first twenty-four hours, after that they have the hard boiled yolk of an egg given to them, this being broken up by the hand, and in some instances mixed with crumbs of bread softened in water. A capital food for young chickens is a paste of oat or barley meal, crumbs of bread, and a little of the yolk of an egg, or finely minced portions of meat. The chickens may be let out on the third day, but dampness should be avoided; if turned out on grass, let the grass be short, and above all let it be freed from the dew or rain by the sun before they are let out. Change of food is essential; the food we have named may be supplemented by light milk curds, a bit of boiled potato, rice, sago, &c.

The following are remarks from Mr. Trotter on the—

"*Management of the Chickens.*—Chickens, for the first twenty-four hours of their existence, do not require food. During this time they are supported by a large portion of the yolk, which, previous to their breaking the shell, had not entered their system. We need not therefore be in a hurry in removing the chickens from the hatching; nest-warmth is what they most require.

"The best food in my opinion, for young chickens, is a paste made of three parts of oatmeal, and one of barley-meal or bread crumbs. The paste may be mixed with a light-boiled egg, or fresh meat. They should, if the weather be fine, be turned out the second or third day. Dampness is very injurious; care should therefore be taken not to turn them out when there is any dew on the grass.

"I have almost omitted to state that water must be given them in very shallow vessels. Curds made fresh every day are a very excellent thing, and are eagerly taken.

"Chickens with the diet we recommend, and with the addition of a boiled potato, and the privilege of pecking grass in the plot, and attention, will make surprising progress. Attention is the great secret in the art of rearing chickens: too much food should never be given to them at once. We will dismiss this part of our subject by a quotation from Tupper:—'Send such as we have; young children and chickens would ever be eating.'

"*At what age should the Chickens be deprived of their nurse?*—On this subject little can be said, much depending on the discretion of the person in charge. Some chickens can forage for themselves when five weeks old, while others require maternal care till they are eight or nine weeks old. I should say, with the advantage of a good house, and plot such as I have recommended, that the hen may be taken from them at the end of six weeks.

"The chickens must remain in the plot three or four weeks longer; in it they are less exposed to accidents than if they were allowed to mix with the other stock."

The following hints on food for poultry we owe to Mrs. Fergusson Blair's most interesting work on the subject, "The Henwife" (J. Jack, Edinburgh):—

"The best and heaviest corn is the cheapest, if we except the small or tail wheat, which, fortunately, is richer in flesh-forming properties than the full-grown and more marketable grain. Fine bran, or middlings, also termed sharps, is richer in two of these important ingredients than any other one kind of food, but being deficient in gluten, is not warmth giving, and is better when combined with the white grain, which, when bruised, or hashed (as it is sometimes provincially called), forms the most wholesome and nutritious food.

"Barley is more used than any other grain. It is cheaper, but unless in the form of meal, should not be the only grain in the poultry yard. Fowls do not fatten upon it.

"Oats, also, are inferior in nutriment, unless in the form of meal.

"Indian corn is a good and economical food, too fattening, however, to be given without judgment. It can be bought at most seaports at a reasonable price, and fowls are very fond of it. I find light wheat, or tailings, the best grain for daily use, and next to that barley. . . . .

"Rice forms a very agreeable change of diet. It can be procured, a little damaged, for a small price. It is cooling and alterative, when properly prepared. The following is the method:—Boil it for half an hour, and then let it stand in the water till cold, when it will be found to have swelled amazingly, and the mass so firm as to admit of being taken out in lumps and easily broken up.

"Buck wheat and hemp seed are greedily devoured by poultry, and no grains are more likely to produce eggs early, and in abundance. During moult give hemp seed freely. It strengthens greatly.

"Groats also form an item in the food of these omnivorous creatures, but are not to be considered ordinary feeding. They should be reserved for the basket of the lady manager.

"Linseed steeped is occasionally given (chiefly to birds destined for exhibition) to increase the secretion of oil and give lustre to the plumage.

"The best sort of soft food is composed as follows:—Mix equal quantities of thirds (sharps) with Indian, oat, or barley meal into a paste with water. This should be worked up into balls, which, if of a proper consistency, break when thrown on the ground, and are thus equally divided among the fowls. The size of the balls secures accuracy as regards quantity.

"Another advantage also is, that if a lady personally distributes the food, these balls are more agreeable to manipulate than the *porridge* mass generally seen, and which fowls by no means relish. Soft food should always be *friable.*

"The potatoe is the only cooked vegetable admissible. It is very conducive to the health and growth of poultry. When mashed and sprinkled with meal, it is a pleasant variety in the poultry bill of fare. Time was when we were wont to indulge our pets freely in its use, but, alas, that is a matter of history now. Forty pounds an acre is a prohibitory price for *them* at least, and I fear for many, too, who once depended mainly upon this fickle root for their support.

"I do not approve of any feeding dish. Poultry prefer to pick their food off the ground, and the gravel and sand swallowed along with it are necessary for digestion. Chopped cabbage, lettuce, spinage, or other green vegetables should be given daily. Calcined oyster shells are also to be used. Fowls are very fond of them, and they tend to produce perfect eggs. They are prepared by burning them in the fire until quite brittle. They can then be easily broken by the hand.

"The first meal, consisting of grain, should be given at six A.M. in summer, and at daylight in winter. That at midday should be the soft food balls already mentioned; and the last grain again, that the fowls may have, during the night, the benefit of the warmth it imparts."

DIVISION FOURTH—DISEASES OF STOCK.

CHAPTER I.

DISEASES OF FATTING CATTLE AND COWS.

THE bulk of the matter contained in the present division has been prepared specially for it by a Veterinary Surgeon, who has had a practical experience in the treatment of diseases during a successful practice extending over a period of twenty-five years. In giving a description of the symptoms and of the treatment of the diseases, the Writer has attempted—and we may here state with considerable success—to divest his language of all unnecessary technicalities—which, when the reader is not acquainted with anatomy and physiology, only tend to bewilder and confuse—and to give his instructions in plain, simple language, which all may easily comprehend. Of course what is here given is not intended to lead the reader to suppose that in practice the services of the duly qualified practitioner can be dispensed with; it is merely intended to convey a general and practically useful notion of the symptoms and modes of treating the diseases which more usually attack farm stock.

The Writer commences with a description of the diseases of young stock, of which the first he names is—

"*Navel-Ill.*—This is not now so prevalent as it used to be. Attention should be paid at once to the parts after birth. If any bleeding, inflammation, or soreness exists, apply a ligature to the cord, not too close to the belly, and then clip off the remainder, keeping clean by fomentations, dressing with some tincture, such as benzoin, myrrh, or aloes, giving a dose of physic—castor or linseed oil 2 to 4 oz.; directly after, a little gruel, in which some powdered ginger is mixed, applying a bandage to support the parts, by neglecting which sometimes, especially in foals, a portion of the omentum or caul protrudes through the umbilicus, between the skin and rim of the belly, causing umbilical hernia, or rupture, as the animal grows, getting larger. In such a case an operation is required, which we have been in the habit of performing by preparing a clam, such as used for castration, but longer; casting the animal, pushing back the internal parts, drawing the skin close; apply the clam, and leave till they drop off; then treat as above; bandage, &c., keeping the animal as quiet as possible.

"*Constipation.*—As is often the case, the animal is not allowed enough of the beastings, or first milk; hence arises constipation, and which a dose or two of castor or linseed oil, 2 to 4 oz., removes; giving gruel in which a little ground ginger is mixed. Somewhat later the same takes place, but from different causes, such as dry food, &c. As this is more a disease of the moniplies, as the former is of the fourth stomach, a stronger purgative may be required; the following the farmer would do well to have always in the house:—Epsom salts 8 lbs., flour of sulphur 2 lbs. well triturated together, and kept in a dry place. Dose for the calf, 2 to 4 ounces, according to age, with a teaspoonful of powdered ginger; full-grown animal, 1 to 1½ oz., with ½ oz. of ginger, and drenching with plenty of gruel, boiled linseed, chilled water; when drenching it should be done gently, and allowing the liquid to be swallowed slowly.

"*Scouring or Diarrhœa.*—Another disease very annoying to the farmer, and which may arise from a variety of causes, such as cold, wet weather, change of food, &c. The treatment, in the first place, is to give a good strong purgative; change the food to bran mashes, &c., when the physic has operated, which will be known by the change of smell and colour of the fæces. If the scouring or looseness still continues, the following, which we have always used, is the calves' and sheep's cordial, as recommended by the late Mr. Youatt:—'Prepared chalk 2 oz.; powdered catechu 1 oz.; powdered ginger ½ oz.; powdered opium 1 drachm (or tincture, 2 oz., which we generally substitute); distilled peppermint-water 1 pint. Mix. Dose, 2 to 4 tablespoonfuls for calf; sheep 1 to 2 tablespoonfuls."

"At a later period in the life of the animal we begin to meet with cases of inflammatory fever; but before entering on *inflammation* in general, we may allude to a disease consequent on the presence or development of numbers of worms in the bronchial tubes, especially in the trachea or windpipe, and larynx, the symptoms of which are continual dry hacking cough, mucous discharge from and sticking about the nostrils, increased or quickened respiration, pulse quickened, but fullish, soft, and very feeble and weak; the animal quickly loses flesh, and unless soon relieved, dies suffocated. Treatment:—Linseed oil with small doses of spirits of turpentine, mixed, 2 drachms to ½ oz., with liberal feeding; but the administration of lime-water (lime-water half to one pint) and salt and water alternately is more beneficial, and for which treatment we were indebted to the pen of Mr. Mayor, of Newcastle, in an able article in the *Veterinarian* for March, 1840. This affection in some years is very prevalent, we have met with many cases. Our plan was to place plenty of salt in the manger, and water always within reach, giving plenty of nutritious feeding, boiled turnips, clover, chaff, and bran, mixed; or to take a handful of salt and dissolve in a quart of hot water, and give a pint at night, the lime-water in the morning. The animals do well under the above treatment, but it is a long time till they are thoroughly well again. Somewhat similar symptoms may arise from a simple cold or catarrh, with slight fever; in this case there is not the continual hacking cough nor the sticking mucus at the nostrils; the breathing may be and is much increased, muzzle hot and dry, legs and ears cold, the animal does not lose flesh so fast, the eyes and nose watering a good deal, pulse increased, but small, hard; moderate bleeding, with full dose of purging medicine, warm bran mashes, chilled water, kept comfortable for some days, and all soon gets right; if neglected, it may cause the lungs to become attacked, and seriously. In such a case the respiration is more laboured, with deep quickened heaving of the flanks; auscultation is here the sure guide, pulse more increased, but harder and smaller, with obstinate constipation. Bleeding is here more called for, in fact it is the sheet anchor of the Surgeon; full dose of purging medicine, following up with, according to age, half-pound doses every twelve hours, till the bowels are thoroughly opened, after which sedatives—flower of sulphur 2 oz.; powdered digitalis 1 drachm; tartar emetic 1 drachm; powdered nitre ½ oz.; twice a day. You may mix the above in the first dose of purging medicine, and as you follow it up; but in our opinion sedatives are of but little use until the bowels are well opened (we are now speaking of cattle). A blister, first clipping the hair close off, should be applied to the sides and front of the chest, such as mustard, 1 lb., mixed with boiling vinegar, adding spirits of turpentine, strong hartshorn (*i.e.* liquor ammonia, fortissimi), of each 2 oz., well rubbed in, or, what we generally use for cattle, powdered Spanish flies. Strong mercurial ointment, in proportions of 2 drachms to 4 oz. When the pulse and breathing get more settled, give the sedative but once a day, never forgetting to keep the bowels open. The obstinate constipation in cattle is the greatest evil the practitioner has to combat in all diseases of an inflammatory tendency; and we would here impress on the mind of the farmer, whenever he sees any of his stock dull, disinclined to graze, standing apart from the rest, although nothing may seem serious, the necessity to have the animal up directly, and if getting on too quickly, bleed and physic directly, get the bowels well opened, and then he has not much to fear. It is by neglecting such simple means that such fearful ravages are made in the cases of black quarter, quarter ill, &c., &c., all which are nothing more nor less than cases of inflammatory fever, or inflammation attacking some particular part or parts. The preceding remarks will apply to a pure case of inflammation of the soft parts of the lungs, or pneumonia; but as is too often the case, proper means are not taken to arrest the disease in its simple form, the inflammation attacks the smaller bronchial tubes running through the lungs, causing disease known as bronchitis (in fact, the two are combined). The cough is here more laboured—a half kind of cough. You may, by careful notice, hear a thick, wheezy, rushing sound from the chest to larynx, or throat, then a grunt, more than a cough, or what may be called a suppressed cough, as if the poor animal was afraid to cough boldly. The animal will continue standing, the head straight, scarcely ever laying down, or if it does, not for long; the mucous membrane, the inner lining of the tubes, getting thickened, causes more the sense of suffocation when lying. It is pitiful to see the forlorn look and sunken eye. The treatment as formerly, bleeding and physic, and blistering from the throat downwards; but from the great prostration, bleeding can hardly be carried so far as the disease actually requires in such cases. We generally insert a long broad seton on each side the chest and dewlap, well smeared with blister unguent. However, in all chest diseases, the sooner one is inserted on each side the dewlap the better; and in addition to the fever medicines, as before mentioned, extract of belladonna, 2 drachms, dissolved in some hot water, and mixed in minderus spirit (*i.e.* liquor ammonia), acetatis, 4 oz., drenching with thick oatmeal gruel, boiled linseed, &c. But the larynx may be involved so that the animal can scarcely be got to swallow the medicine without fear of choking; this is laryngitis combined, in which case the throat is much swelled and very painful to the touch. The breathing in this case is loud, in fact before seeing the patient you may know what is the matter by hearing the loud sonorous breathing. Same treatment as before, with the addition of trachæotomy, that is, making an opening in the windpipe, and inserting a tube made of leather for the purpose. At one period in our practice we were terribly annoyed with this disease; but in the cases (the majority however) it was more confined to the larynx (throat) than extending downwards. Often when congratulating yourself on what a fine cure you have made, a hard round tumour, called clyers, begins to put in an appearance. We have often been called to such cases, after being neglected, and there have found a poor emaciated animal, tongue protruding, slavering, eyes swelled, and all the symptoms of choking. Energetic treatment is here required: in the first place, perhaps, trachæotomy. Clip the hair close, and well rub in the following round the throat, from ear to ear:—strong mercurial ointment 4 oz.; hydriodate, or iodide, of potassium, 4 drachms; and repeat till the tumour is either absorbed or brought to a head, when it points open, and allows the matter to escape.

"*Disease of the Pharynx* is often the accompaniment of laryngitis, in fact, we may say always, in a greater or less degree. Still *pharyngitis* may exist of itself. The symptoms are very much alike, with this difference—the appearance of a large pouch or hanging down of the skin from the throat to the lower lip, as if full of fluid, greater difficulty in swallowing, and the food and liquids often returned through the nose when in the act of swallowing.

"Treatment:—Bleeding, blisters, physic; a seton right through the pouch, between the jaws, from bottom to top, well smearing the seton with blister ointment. We may here observe that if the inflammation is locally confined to the pharynx, or exists there in a greater degree than in the neighbouring parts, the case is generally fatal, from suffocation. In such cases treatment is but of little avail, the parts being so deep seated; promptitude in the treatment as above in the early stage is the grand desideratum. *Post-mortem* appearances show extensive disease in the neighbouring parts as well.

"*Pleurisy*, or inflammation of the membrane lining the chest, *i.e.*, thorax, or membrane covering the lungs. It is seldom that pure cases of pleurisy occur, except from punctures of another's horn; but oftentimes, when combined with pneumonia, it seems as if greater inflammation existed in the membrane than lungs. The symptoms will indicate more painful cough; at each cough the abdomen will be drawn very much up at the flanks, and cause something like a half cough. By pressing the thumb between the ribs, near the elbow, the poor animal will indicate much pain. There will be shiverings of the fore-legs, especially on the side which is most affected; the elbows will be kept as wide apart from the sides as the animal possibly can; the pulse is harder, quicker, and smaller, feeling like a hard small wire vibrating under the fingers.

"Treatment:—Bleeding, physic, sedatives, blisters, setons, or even scalding water. If produced from a wound, and if there is much internal laceration, the case is generally hopeless, at least we never saw much good derived from treatment. If the skin is much torn, stitch up, exclude the air, dress as a simple wound, with strong diuretics, in addition to the above; but in such cases it is best to consign the animal to the butcher at once. But if merely a puncture through the skin and muscles, and the pleura is uninjured, stitch up, if required, exclude the air after each dressing, get the bowels well opened, and quickly; if very fleshy, bleed, but you cannot be wrong in bleeding either way. Keep the animal quiet. In such cases all will soon be well.

"*Chronic Pleurisy; Chronic Pneumonia.*—It often nappens, as we have before observed, that a cow will be seen standing apart from the others. Perhaps, if disturbed or driven across the field to the others, she may again commence grazing, and as the farmer does not notice anything particular the matter, as he thinks, takes little or no more thought of it; whereas the animal may bate a little in her milk, there may be, and no doubt is, increased cough or hoost, still no particular attention is paid. The weather may be warm and mild, and as there is not much exercise required from the cow, there is disease slumbering along, and only perhaps confined to one side. Cold, wet weather, with a north-east wind, sets in, the other lung takes on acute inflammation. The increased serious symptoms alarm the farmer, who then sends for the 'vet.,' who finds a case of *acute* pleuro-pneumonia on one side, and *chronic* on the other.

"From 1846 to 1851 we had great numbers of cases of the above, in fact, epidemical, or in other words, epidemic pleuro-pneumonia. But we have observed in many instances, where a farmer had purchased fresh cows in calf at a fair—and, as is generally the case, somewhat poor in condition—and these having travelled a considerable distance, and the weather being unpropitious, the disease has broken out in these fresh cattle. In fact, the slumbering fire, from the change, &c., has been roused. We are of opinion it is not contagious, having had many cases, in one stall, where one would be acutely affected, the other never taking the disease at all. Hence, we were never particular as to separating the sound from the affected, as we considered the same predisposition, the same exciting causes from atmospheric influence, liable to produce the disease in the one as the other; but we were always particular in regularly examining the sound ones, and if we perceived the least increase of the circulation, or in respiration, we had the animal bled and physicked directly. And we may observe, that where the disease has broken out in these fresh cattle on a farm, it has been confined to them alone. Still we have often, at the wish of the farmer, when the disease broke out, bled and physicked all the others, whether they required it or not.

"We may be wrong, but such are our conclusions from experience in a great number of cases, and in which we were very successful, as far as regards the saving of life. The symptoms are similar as stated in pleurisy, with the exception of a peculiar inward kind of grunt; then a 'hoost,' or cough; then the grunting; then a hoosting, particularly if roused much; by pressing the thumb between the ribs, excessive pain is indicated; the animal will toss her head round at you, and kick with the leg on the same side as you press; the poor animal can scarcely stir, and when she does, seems like lifting herself off her feet all at once, arching the back, then the lift, to describe which properly, so as to understand, it is difficult; it must be seen. The elbows spread out as much as possible, to give room for respiration. In some cases the appetite and rumination are gone for some time; then recurring again; and so on, at intervals, until the disease is beginning to terminate favourably.

"The grand object in the treatment is endeavouring to confine the disease to the one lung which has become partially hepatised or consolidated, by bleeding, physic, blisters, setons, sedatives. We are great advocates for the extract of belladonna in these cases, combined with liquor ammonia acetatis, the sedative powder, dissolved in strong chamomile tea; our usual formula after the bowels are well opened, or mixing with the physic, at once—

Pulv. Potass. Nitratis	4 drachms.
Gum Camph.	2 „
Tart. Antim.	1 „
Pulv. Digitalis	1 „
Ext. Belladonna	2 „
Liq. Ammon. Acet.	4 ounces.

Give twice a day, with the addition, so as to keep the bowels open, of flour of sulphur, 2 to 4 oz. The bleeding is often required to be repeated, which must be regulated according to the pulse, no certain rules for which can be laid down. The *post-mortem* appearances present most extensive disease of all the parts—lungs, pleura, heart; one is most astonished how the animal could live so long with such extensive disease going on. Animals have recovered from this disease, at least so far that they begin to feed well, and give milk as usual, still there is the chronic diseased state of the organs, hoosting or coughing; and especially when the weather commences to be cold, wet, or changes from mild dry to cold and wet, such animals should be carefully looked to, especially as to keeping them comfortable and dry, paying particular attention to the bowels, for when in this phthisical or consumptive state the exposure to bad weather is apt to rouse the disease worse than before, and a deal more formidable it is, requiring great care and patience in the treatment. Such animals will fatten readily in the summer, and ought to be got rid of, when ready for the butcher. In the winter, or cold wet weather at any time, they ought to be kept more in the fold-yard, and fed on boiled turnips, chaff, mangolds, &c., all mixed up in bran, and given when cold. Occasional doses of physic, sedative, bleeding, all may be required. We confess these are but hints on a highly interesting and most important subject, on which a separate treatise may be written. The farmer should narrowly watch his stock, and ascertain if the roots of the ears and horns are more than naturally hot, the muzzle or nose dry, or alternately dry and moist, hoost or cough wheezy; if he perceives such symptoms, let him have the animal up, bleed and physic till the bowels are well opened; if there is pain at the side on pressure, apply a blister, or the mustard cataplasm well rubbed in By paying strict attention to the foregoing instructions, much expense and anxiety of mind will be saved.

"We will now proceed to the diseases most incidental to the abdominal viscera, and will commence with the *Æsophagus,* or *gullet,* the common cause of which is obstructions caused by potatoes, turnips, nails, &c., from being imperfectly cut, or by bolting them whole, causing the animal to be what is termed choked. The symptoms are, the paunch is distended, hoven, the eyes look wild, staring, with profuse watery discharge, *i.e.* tears, foaming at the mouth, which is generally closed. After the inflammation is subdued, and with a view of preventing hepatisation, or consolidation of the lung, we have given ½-drachm doses of iodide potassium dissolved in water, twice a day, with decided benefit. No time should be lost—if the regular mouthpiece and probang is not at hand, but which no farmer should be without—in placing a round thick piece of wood in the mouth, tie with a piece of cord from end to end round the horns, then endeavour to find the obstruction, which is generally a little below the bend of the throat. Try to move it either upwards or downwards, and drenching occasionally with a little linseed oil, or melted lard, will greatly assist you. If by that means you cannot remove it, get the horse-balling iron and place in the mouth. Oil or grease the arm and hand, the smaller and longer the better. Insert the hand gently, half turning the hand as you push it on, until you reach the obstruction, and by the help of an assistant, pressing towards you the obstruction. We have often seen large pieces of turnip got up, which it was impossible to send down with the probang, especially where the obstruction was of a three-cornered shape. We would press upon all never to have recourse to a whip-handle or any of those rough instruments, which often lacerate the gullet, and cause the death of the animal, which, when such is the case—laceration—the sooner the animal is slaughtered the better. In using the probang—*Read's*, which may be got at any ironmonger's—after having strapped on the mouthpiece, let an assistant at each side take hold of the handle of the mouthpiece in one hand, and the horn in the other, and keep the head straight out and steady, which, by-the-bye, is sometimes not so easy to do as appears now to be the case when directing the reader. Well grease the probang, and insert the cup-end gently, slowly, but firmly, and push on, and when the paunch collapses you may be sure of having gained your object.

"In *post-mortem* examinations we have found a piece of a large nail lodged across the gullet, close to its opening in the paunch, which did not seem to cause urgent symptoms until the animal came to be put on dry food, when after eating a small quantity the paunch would suddenly get hoven, and then great efforts at vomiting, after which having taken place all seemed well again, until the next lot was eaten. Tried physic, no good; next the probang, and when pushed on till near all its length, such painful struggles took place we were obliged to desist, as the animal was near her calving. She was fed on boiled food, well broke up. All went on pretty well, with occasional vomitings, until she calved, and being under the circumstances got in fair condition. Some time after she was slaughtered, which we attended, and found the nail as above.

"*Hoove* is either an accumulation of gas or food, causing great distention of the rumen or paunch, easily distinguished by pressure at the flank; if the former, as if pressing a bladder filled with wind; if the latter, it feels a hard compact mass. The treatment: linseed oil 1 pint, turpentine 4 oz., mixed, may be tried; but from the peculiar anatomical structure of the parts in cattle, the chances are but small of any medicine entering the paunch by drenching, when so distended, to be of any benefit; still, in the early stage, when first observed, it can be given and may be of benefit. If gas accumulates, use the probang as in choking, pushing the lobe end gently on until the gas rushes out and the paunch collapses; or in puncturing with strochar and canula; but where none of these instruments are at hand, take and use a sharp penknife. The proper place for puncturing is found by spanning with the fingers placed on the rump bone to the ribs, and where the thumb rests that will be about a safe place; but simple as the operation is, some times serious results happen by a portion of the contents escaping into the abdomen. The safest and surest mode is to use *Read's* stomach-pump. Inject about half an ounce of chloride of lime dissolved in about a gallon of warm water, into the paunch, repeating if required. Next give 1½ lb. purgative mixture, with 1 oz. of ginger, repeating every morning, with 4 oz. of the same, and ½ oz. of ginger, until the bowels are thoroughly opened, giving bran mashes for a few days. If the paunch is distended from food, inject with the stomach-pump plenty of warm water into the rumen ; that may cause vomiting, if you cannot even pump it back. When the pump cannot be had, puncture as before, and make an incision so as to allow of the introduction of the hand, and so empty the paunch, taking care that none of the contents escape into the abdomen by pressing the two forefingers of the right hand in the paunch, and the thumb on the skin, pressing them together, while you empty with the left. Before releasing the parts with the fingers and thumb, allow all the frothy contents to cease, or, as we have sometimes done, insert one end of a towel into the paunch, leave a portion hanging out, and then give the purgative medicine as above (with the addition of bleeding), and continue the same treatment. After the paunch gives over discharging at the opening, withdraw the cloth carefully, wipe clean, and sew up the wound. Keep the animal quiet, giving boiled food, and paying strict attention as to quantity for some time. We would advise after such an operation that the animal be got in condition for the butcher. Although the rumen is but little supplied with blood-vessels or nerves, and seems little susceptible to inflammation from rough treatment or the presence of foreign bodies, yet it is very susceptible when anything poisonous is administered or partaken of, such as the leaves of the yew-tree, of which we have had a few cases. Although the animals had been accustomed to graze in a field surrounding the mansion (for some years the house had been empty, and was being put in order, having been sold), in which were many yew-trees, forming a portion of the fence, the cows—a large dairy—had never been known to eat them while on the trees; but being now clipped, and falling on the ground, they ate them. The farmer was aware of their poisonous qualities, but, as he said, who would have thought of the cows eating them off the field when they would not touch them on the trees, and could easily have done so?

"They had not partaken of the yew above three hours before we saw them, at least the men who were clipping the hedge declared so. However there were most alarming symptoms in some of them—rolling, bellowing, frothing at the mouth, paunch very much distended, eyes wild staring, respiration very much quickened, in fact, it was dangerous to go nigh them; others again, in a state of stupor, hanging the head, frothing at the mouth, respiration very quickened, eyes staring wild, very watery, paunch distended; however, when roused, they got as wild as the others After a deal of trouble, and no little danger, we had them secured, one by one. We bled each one until they began to stagger, and gave each 1½ lb. purging powder, with ginger, drenched with lots of warm water, in which was mixed spirits of hartshorn 2 oz., occasionally; and when that was done, brandy, then gin, or some other stimulant, till we got some more ammonia. After eight hours, we bled some more that seemed worse, and gave another dose of purging medicine, &c., to all, and so on, until the symptoms were relieved and the bowels responded to the medicine. Stomach-pump was of no use here; we could not use it; yet in their rollings and bellowings they never stirred far from the spot they were on, nor could we get them, without rousing their fury again, secured to trees. However, they all ultimately did well, except one, which died the same night. The *post-mortem* examination showed extensive inflammation in the paunch and *reticulum* (second stomach), *moniplies* (third stomach), the contents of which were commencing to cake a little, but by sympathy, for we could detect no yew in it; the *abomasum* (fourth stomach) was but little, if any, altered. In fact, the yew had no time to reach the two last, as no rumination had taken place. Had it done so in the lot, we believe not an animal could have been saved. The lungs appeared as if the animal had died from congestive pneumonia. Whether the ammonia or spirits had any effect in counteracting the acrid poison of the yew we cannot well say. Our opinion is it had.

"Next in order of the stomachs is the *reticulum*, of which we cannot say more than as above; but the one of the greatest importance is the *moniplies*. In fact, there is no disease to which cattle are liable in which this stomach does not participate or sympathise in a greater or less degree. Hence, in all diseases or slight injuries, the necessity for the free use of purging medicine, which in the horse is inadmissible. For instance, as an illustration: a cow is perceived to be a little lame; still she grazes, gives about her usual quantity of milk, &c. No particular notice is taken of the lameness, till in a few days the milk decreases; still she may be grazing. No particular attention is yet paid her, till in another few days there is a cessation of milk, grazing, and rumination. Then the cowmen and farmer begin to be alarmed, and after washing and examining the foot, are surprised to see so much injury has been done and so much disease going on, and yet there seemed so little the matter. The cow has never got farther to travel than from the field to the byre and back. In the horse, the disease or injury would have been looked to, and well, before the cow's is thought of being looked at.

"Now all this time there has been fever going on; digestion is but imperfectly performed; the peculiar, but regular motion — *i.e.* peristaltic motion—of the stomachs and bowels is interrupted, more especially in the moniplies, from its numberless leaves or folds for triturating the food after the first and second mastication, which, owing to the pain, is but imperfectly done, and from the decreased action of these folds or leaves, portions of food get fixed between them, and become hard and dry. Still, from the accumulation of ingesta onwards in the large and small intestines, the fæces or dung may be soft; but to the practised, careful eye, small pieces, flat and thin, black, hard, and dry, might be detected; and if closely examined, a stinking smell from droppings in health. At this stage perhaps some dressing is applied, but no thought of physic; and as the cow is not now able to travel to the field, some dry hay or straw is thrown before her, which only increases the fever going on, until, in another day or two, the cowman will call his master's attention to the fact that 'the lame cow has never dunged for ever so long, and she won't eat anything.'

"The practitioner is now called in, and a formidable job he has got. Now in such cases—of which we have had no end, we may say—do what we may, and hard as it is to do, although we produce copious discharge of fæces, still that stomach is never again got into its natural state. Yet the animal may get round again, and fatten or milk well; but with change of food, weather, or any exciting cause of slight fever from cold, that stomach is the first to sympathise. Hence the necessity of having, in all cases, however slight, recourse to purging medicines directly anything is the matter.

"We think we have said enough on this subject to warn the owner of stock how careful and attentive he ought to be in such simple matters at first. At the same time, we have met with many pure cases of inflammation of the moniplies in feeding-bullocks brought up from grass to the straw-yard in winter, the symptoms of which are:—the animal has dull eyes, heavy look, is off his food, rumination ceases, unwillingness to move, seldom lies down, muzzle dry, roots of ears and horns hot, respiration and pulse not so much altered. The pulse[*] is soft, full, slower, with a weak wavering feel under the finger; obstinate constipation, with the exception of small, hard pellets, glued together with a thick, slimy mucous, dropped occasionally, or brought away with the hand, or by injections. We cannot say whether we have found much benefit from bleeding in such cases; still we always did bleed, and that largely, giving a full dose of purging medicine,[†] and repeating the same twice a day, varying the medicine, in half doses, until the bowels responded, drenching largely and often with oatmeal gruel and warm water.[‡] If the bowels do not respond to the medicine in a few days, and the animal is at all fleshy—in which state animals generally are—we advise that it at once be consigned to the butcher; or if the constipated state of the bowels has existed some days before being called

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[*] The pulse, in a state of health, numbers about forty beats, and feels soft and full and round under the fingers; in a state of disease it may range from forty to sixty, to seventy, eighty, or higher, and feel thin and hard, this denotes high state of fever and inflammation; above sixty to seventy dangerous, the animal cannot last long if the pulse is not subdued. When much below forty, feels soft, flattish, wavering; it denotes debility or extreme weakness.

[†] Purging Mixture . . .	1 to $1\frac{1}{2}$ lb.
Cream of Tartar . . .	4 to 6 oz.
Croton Oil	10 to 20 drops.
Linseed Oil	1 to $1\frac{1}{2}$ pint.
Croton Bean	10 to 15 grains.

[‡] In drenching, administer very slowly, by little at a time; never forget the carminative. If it can be got, in these obstinate cases, new wort is a very useful assistant. Barm, *i.e.* yeast, has been given and extolled in these cases. We never give it ourselves, but "a drowning man will catch at a straw.’

in, our advice is the same. In other cases, in which the treatment was persevered with, and the bowels had become acted on, they somehow never seemed to do well or fatten so kindly, requiring great care in feeding and attention to the state of the bowels—sometimes very loose, at others constipated. However, a full dose of purging medicine would, in either case, set all right again.

"*Post-mortem* examination in those which were not treated, or only for a short time:—Contents of chest and abdomen all healthy, with the exception of the moniplies, which would be enlarged to nearly twice its size, hard, and heavy as stone, and a gritty feel when being cut, as if it were a piece of turf; folds and contents dry as tinder, and sticking together. In the other cases, as above, we requested the owner to let us know when they were ready for the butcher, as we wished to have a look at the moniplies, which was usually found partly natural, partly hard, or if we might so express it, half hard, half soft, and with a gritty feel when cut.

"Now, in our opinion, in those cases of dairy cows, or cows which have been for some time in the dairy, and being barren are laid in for fattening, and to which we are called to treat, we generally find the animal 'skin and bone,' with profuse diarrhœa, a *phthisical* cough, and in which little or no good can be done. You will always find the moniplies after death in this partial diseased state; and it is this chronic diseased state of the lungs, pleura, and *moniplies especially*, which is the cause of so many animals being carried off by dysentery, and in which all our treatment is of no avail. On the other hand, cases are met with, if not of long standing, in which, with treatment and good nursing, we may get the animal in a state of apparent health, and fattened fit for the butcher, as far as outward appearances go; but when killed, the lungs' pleura will be found in a sad state of disease, and the moniplies in that half hard, half soft state as before mentioned.

"*Inflammation of the abomasum,* or fourth stomach, and of small intestines, will proceed from this disordered state of the moniplies, or from the administration of anything of a poisonous nature in a fluid state, or from eating anything of an acrid nature, such as yew, &c.; or, as we have observed in very hot weather, when cows are much annoyed by the fly—a species of the gad-fly—running about the field, tail up in the air, bellowing like mad, and in this excited, heated state, drinking largely of cold water. When taken up, the milk will be found diminished, rumination ceased, the animal uneasy, pawing the ground and striking her belly with forelegs, kicking with hind-legs at the belly. Profuse thin discharge of fæces, with much smell; laying down, but very uneasy; quick stretching out of legs, and drawing them up; head one time stretched out, again resting on the side; breathing much accelerated, pulse hard, quick or irregular. When made to get up, stands quiet for a little, hanging down the head, then uneasy, stamping and kicking with the feet, voiding fæces profusely, sometimes urine as well. There is hoove, but not so much of the rumen as of the intestines, large and small. A hot, sweaty dew all over, then a change to a cold clammy state. In some cases the brain seems to participate, the animal is seen to stagger, perhaps fall. The treatment: bleed, and that largely, and give a full dose of purging medicine, repeating the bleeding and half a dose of medicine in twelve hours. If the symptoms are not abated, combine with a sedative a mustard cataplasm well rubbed in all over the belly. After the bowels are well opened, and there is still some fever, continue sedatives, and keep quiet for some days. Change the diet to bran mashes, &c., and in most cases all will soon be well.

"On the other hand, unfortunately for the farmer, the cowleech may bleed, but he knocks down again by his cordials, stimulants, &c., mistaking the looseness as to cause and effect; gives strong astringents, and if the animal survive such treatment, the foundation is laid (especially if there is any tendency to inflammation of the lungs from a chronic diseased state, and in such cases they always sympathise in a greater or less degree) for dysentery, the large intestines becoming involved as well. Such again, in our opinion, is another origin of the chronic dysenteric, phthisical, skin-and-bone cases so often met with. The treatment as a whole may be here stated of these cases. When called to one of these chronic dysenteric, phthisical cases—the symptoms of which, especially the cough, can hardly be committed to paper (they are well known to all farmers)—we bleed, blister the sides, insert setons, and endeavour to change the ingesta by changing the food to boiled turnips, clover, or sweet hay, chaff mixed with bran, and plenty of thick oatmeal gruel (no water), for some days, when we can get so desirable a change; or if not, the way is paved for medicine—say a pint, to one and a half, of linseed oil, giving a little gruel in which is some ginger directly after, and if that causes an increase of more consistence or thickness of the fæces, and continues so, let well alone, and stick to the same dieting, until the animal is in a fit state for the butcher. For if again turned out to grass, ten to one if the looseness does not return; or grass may be cut, and when a little dry, given alternately with the cold boiled dieting. Again, if the dysentery should still continue, astringents* must then be tried, and starch clysters, in which is mixed some tincture of opium (*i.e.* laudanum), emptying first the rectum with a little warm water; then throw off the starch, and endeavour to retain in by keeping the tail close down with the hand.

"*Inflammation of the liver*—*i.e.* yellows, jaundice—may be caused by disease of that organ, or may be caused by obstruction in the biliary duct, or by hydatids—*i.e.* fluke worm. However, from whatever cause, the symptoms are, yellowness of the eyes and skin, irregular rumination, quickened pulse, roots of horns and ears hot, great unwillingness to move, shivering of the right side, especially of shoulders, with stiffness, as if lame there, constipation of bowels, urine light brown colour, fæces light brown. Treatment: bleeding, mustard cataplasm or blister on the right side, full dose of purging medicine, and follow up every twelve hours with half or quarter doses till the bowels are well opened. Diet: boiled food, with bran mash, after the bowels are well opened. Should the

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* Astringents :—

Prepared Chalk	½ ounce.
Powdered Ext. Catechu	¼ „
„ Opium	½ drachm.
Or the Tincture of Opium	1 to 2 ounces.
Powdered Gentian or Ginger	2 „ 4 drachms.

Mixed in starch gruel.

Varying the astringent—

Half a pint of distilled Peppermint Water.

Sulphate of Copper	2 to 4 drachms.
Powdered Gentian	2 „ 4 „

Or, what we have derived benefit from in such cases—

Iodide, or Din. Iodide of Copper	1 to 2 drachms.
Powdered Gentian	2 „ 4 „

Mixed as above.

Or Powdered Alum	2 „ 4 „

Dissolved in Milk.

appetite not return, give daily, sulphur 2 ounces, nitre 4 drachms, powdered gentian 4 drachms, dissolved in strong chamomile tea, or divide the dose and give night and morning. We have met with cases of rupture of this organ; of course there is nothing can be done in such cases.

"*Hæmaturia,* or *red water,* is decidedly, in our opinion, a derangement of the digestive organs, and in which the moniplies, especially the liver, take an active part; the kidneys are but secondarily, or we may say sympathetically, affected, from some peculiar acrid substance in the blood. The disease may arise from a variety of causes. Take a few instances—changes from hot dry to cold wet weather, at the same time from dry to cold wet pasture, or in hot dry weather from an insufficient supply of water. To a cow shortly after calving, or say, a cow in rather too good condition at the time of calving,—or if too much dry food is given at the time of and after calving,—which may have been kept up, well nursed, then turned out, experience of any of these atmospheric influences will be highly prejudicial. In such cases the best preventive is a good dose of physic before and after calving (the same may be said as to preventing dropping after calving). The symptoms are at first a slight cessation of milk and rumination, ears and horns hotter than usual, pulse quicker, slight increase of respiration, scouring, urine higher coloured; if proper remedies are not now applied these feverish symptoms will increase. Constipation (that enemy in cattle practice), and that of an obstinate character, will then set in, the urine will get quite red, the fever will still increase, the urine will get darker, clots of blood may be seen, and if these symptoms are long continued or improperly treated, the animal will be lost.

"Treatment:—Bleeding, full dose purging medicine, with half or quarter doses every six or eight hours until the bowels are well opened; dieting on boiled food, bran-mash, liberal supply of thin gruel, or drenching with it. After the bowels are well opened and the fever abated, and the urine still high coloured with clots of blood, give spirits of turpentine 2 to 3 oz., linseed oil half to one pint, which may have to be repeated, paying particular attention to state of bowels. After the above symptoms are all abated and much weakness left, give powdered gentian $\frac{1}{4}$ oz. in a strong decoction chamomile tea, and be careful not to expose the animal in coarse, cold, wet weather.

"*Inflammation of the kidneys.*—We cannot say that we have met with pure cases, unless from the effects of blows, falls, &c. The symptoms are something similar to the above, but the fever stronger,—if pinched on the back the animal will crouch from pain nearly to the ground; but examination, per rectum, is the sure guide; you can then feel the degree of heat in the parts,—and voiding the urine causes greater pain, spasmodic as it were.

"Treatment:—Same as for 'red water,' with the exception that the *spirits of turpentine* or any other *diuretic must on no account be administered.* Apply a large mustard cataplasm across the loins, giving or drenching largely of boiled linseed, and above all, pay attention to the bowels, even if the animal is scouring. When first perceived, do not hesitate to give a dose of physic, for constipation is sure to set in, and perhaps defy you, give what purgatives you may.

"*Puerperal fever, i.e.* milk fever, dropping after calving, is a highly dangerous inflammatory disease, and in which the whole system participates; it may occur at any time of the year, but in most cases at the hot season, and especially in animals which are in a high state of condition; and as prevention is better than cure, cows which are in high condition before calving, say four or five weeks, especially in hot weather, ought to be bled, the bowels well opened, and put on shorter commons until after calving; and when calving has taken place, an hour or so after give a good dose of physic, with plenty of bran-mash, and nothing else for a day or two.

"Symptoms. We will premise the animal has calved; in a few hours after she appears somewhat dull, off her feed, and if observed, muzzle dry, ears and horns very hot, pulse quickened, respiration increased, and if notice is taken, no dung has passed, or at least perhaps only once; now is the time for bleeding, and largely; full dose of purging medicine, and follow up every six hours till the bowels are opened.

"In many cases to which we have been called* the drink alluded to in foot-note has been given; ay, we have even known a whole bottle of brandy to be given, and by those who ought to have known better;

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* "The very last case we had last summer, 1862, was a beautiful cow, pure short-horn breed, the property of a gentleman, and a breeder, and in very high condition. She had calved in the morning, and all seemed to be going on well until towards night, when she appeared not so well. What does this gentleman do? Sends his coachman to the druggist for a drink. He sends what?

6 ounces of salts.
2 „ oil of juniper.
2 „ sweet spirits of nitre.
Some ginger.

There were some other ingredients, we forget what. There was medicine for an animal in a high state of inflammatory fever! We were sent for in great haste the following morning, and in half an hour after we got there she was dead; and no wonder. Even had she been well, the strong stimulant diuretic medicine would have made her bad, if not killed her.

and we have found the animal lying full length, moaning, dashing her head first on her side, then on the floor, eyes glazed, and all the appearance of a quickly-approaching death. If you attempt to give anything, it will only choke her, for she cannot swallow. Again, cows in low or poor condition may be attacked, especially if being rather too much fed on dry food, or forced somewhat before calving; but in this case those alarming symptoms are not so sudden. A couple of days may pass, when the milk is found to diminish, the udder gets hotter and more tender, appetite indifferent, rumination partial, ears and horns hot, pulse increased, respiration also, constipated bowels. If these symptoms are neglected (and as in the former case the cordial drink has been given), the animal will appear to get unsteady in her gait, will have a difficulty in getting up, bowels costive, till at last symptoms take place quite as alarming as in the former case.

"Treatment:—Bleeding and physic, full dose, with some croton nut or oil, following up half doses every six hours until the bowels are opened; and when such has taken place your animal is safe. Keep well fomenting and drawing the udder. If the pulse keeps full, hard, quick, however weak the animal may appear, have no fear in bleeding. Again, if the pulse is low, feeble, irregular, stopping as it were for a few beats, then commencing again, bleeding would not be admissible here; still don't neglect the medicine. We have been in the habit, directly after bleeding and giving the physic, of well rubbing in the strongest spirits of hartshorn, spirits of turpentine, and olive oil, of each equal parts, along the back and loins. When once the bowels are opened the animal will soon be trying to get up, in which you must assist her gently;

if she has lain long, keep turning her from one side to the other various times in the course of the day, and if there seem still fever existing, give sedatives once or twice a day, but on no account neglect the bowels; and however weak and feeble she may seem, allow no cordials or stimulants to be given but the small quantity required in purging mixture; coaxing her with food, small quantities at a time and soft, unless when you are perfectly sure there is no fever existing. You may give $\frac{1}{4}$ oz. of gentian or ginger, mixed in some warm mild ale, or chamomile tea. Never think of slinging the animal, it only injures, and sometimes irreparably.

"We have often met with cases of a *loss of power of the hind extremities* in cows when about four or five months off their pregnancy, and from no apparent cause either from injuries or otherwise. We used to consider it a sort of rheumatic fever, and treat it as such. The animal will have been observed for some time, although feeding about as usual, not thriving so well. Stiffness all over, rumination irregular, the dew on muzzle, the same with an increased hoost or cough, and if closely examined the pulse will be quicker but full; respiration increased. These symptoms will continue and increase till constipation has set in (but previous to this the bowels may have been too much relaxed), and the animal will be found lying down and unable to get up of a morning, when at last milking she seemed no worse than usual. Now, although the animal may be poor in condition, and to all appearance feeble and debilitated, still there is fever accompanied with inflammation, in a greater or less degree. Bleeding is here required, but with caution, the pulse being the guide, especially if there is total or partial cessation of the milk; and the next of importance is physic, repeating till the bowels are well opened; then give a sedative powder daily, dissolved in chamomile or feverfew tea, and apply the strong embrocation as before prescribed in milk fever, along the back and loins, giving plenty of boiled food, bran-mash, and keeping the animal dry and comfortable, paying attention to the state of the udder—fomenting, and apply a little of the embrocation, with the addition of half more oil. In most cases the animal is generally quiet, listless; in others, seems wild when disturbed, and if she could get up, rush at you; as it is she tries to do so by crawling on her chest. Bleeding is more required in such cases. The animal seldom recovers her milk until after she has calved. By pursuing the above treatment the animal will be found sooner or later as unexpectedly standing up, seemingly well as she was found down.

"There is another species of dropping or loss of power in cows which are not even in calve or giving milk—the effects of cold and wet on an old and debilitated frame. It is a loss of nervous energy, or what we may term partial paralysis or palsy. We have often met with such in the cows of poor cottagers, ay, and of the well-to-do farmer as well. The cows have passed a hard winter in the shed or farm-yard, with little or no attention paid them in regard to food; in the one case from inability to purchase, in the other, because not a source of profit. They must do as they can till the spring grass begins to come, when they are turned out to a scanty supply; and in cold wet weather, if taken up at night, nothing is perhaps given unless a little musty hay or straw.

"During the winter the bowels may have been at times costive, at others relaxed. After a few days the animal is seen to stagger, or straddle in the hind quarters, or the fore extremeties; either looseness or constipation may now set in, too often the latter, but if the former, the latter is generally sure to follow. If no attention is given to the staggering gait, in way of better feeding or comfort, the poor animal will soon be found either in the field or shed, down, and unable to get up. If in the former, a strong hurdle should be got, on which is tied plenty of straw, the animal turned over on it and drawn home, placed in a dry, comfortable, but not too close a shed, plenty of dry litter, and kept from a draught of the cold wind, turning her occasionally. If the bowels are costive, give a dose of physic, giving plenty of boiled food, bran mash, boiled linseed, oatmeal gruel, or if necessary, drenching with plenty of the two last. When the bowels are opened, give gentian, ginger, and carbonate of ammonia, of each 2 drachms, in chamomile tea, mixed in gruel, not over warm, with an occasional ¼ oz. sweet spirits of nitre. At times omit the carbonate ammonia, and give sulphate of iron powdered finely, 2 to 4 drachms. If the bowels are relaxed before giving purging medicine, pave the way with food as above, until an alteration in the fæces takes place, by getting more pultaceous. If there is increased hoost or cough, be in no hurry to give any of the tonic stimulants until you see what course the bowels are to take. If the bowels continue much relaxed, we would give linseed oil in preference to the purging powder, then treat as above, or look back to dysentery at phthisis.

"*Garget, or inflammation of the udder,* may take place shortly after calving, and especially in cows in full condition, and in which the usual purgative has not been given before and after calving, or in which the milking has been discontinued too early before calving; but the most frequent cause is the abominable system of hefting, *i.e.* not milking the animal in a morning before taking her and calf, muzzled up in some form, to a fair or market to be sold, with the make-believe idea, from the enormously distended udder, that she is a great milker. The Society for the Prevention of Cruelty to Animals should take cognisance of this fact, for it is cruelty in a high degree. And here we would advise any one who purchases an animal under such circumstances, whenever he reaches home, to bleed and give a strong dose of physic, fomenting the udder for some days, and drawing all the milk well off; or what is better, allowing the calf to be loose with the mother, and suck *ad libitum* for some days. In cases of this complaint, say a few days after calving, the udder seems hotter and more tender than it ought to be, uneasy to be milked from the pain, small lumps like peas may be felt in the teat or bag, and is generally confined to one or two quarters ; seldom the whole udder is affected, unless in such abominable cases as above. If no attention is taken of it at this stage, the inflammation will increase until there is total cessation of milk from one or perhaps two quarters. The part is then hard, distended, hot, and painful: the pulse and respiration will be increased, rumination and the dew on the muzzle will be partial or quite gone, with constipation having set in.

"Treatment :—Bleed, and largely ; give full dose of physic, repeating until the bowels are well opened ; constant fomentation with water as hot as the hand will bear. If the part is not getting less in size, free from pain, and the milk returning, matter may be forming, so still continue your constant fomenting, examining the bag where it is likely to break, and if it appears ripe, open with a penknife or a lancet, and let the matter out ; better to do so than allow it to break of itself; then foment twice or thrice a day, and insert a little tow smeared with the digestive ointment. Again, the udder, or parts of it, may keep hard or indurated. In this case well rub in some compound soap liniment, in which is mixed tincture of iodine in the proportion of 4 oz. of the former to 2 of the latter, or 1 drachm of iodide of potassium to 1 oz. of lard. The teats are often in such cases excoriated, cracked, and a serous discharge issues from the sores. After fomenting apply spermaceti ointment 1 oz., powdered calamine (*i.e.* carbonate of zinc) 1 drachm; mix and smear on the sores. We need not add how requisite it is in endeavouring, but gently—well lubricating the hands with cream or lard—to draw off all the milk that can be possibly got in the course of the treatment.

"In cases which have been neglected, the parts may become gangrenous or mortified. In such cases remove with the knife all diseased parts, apply a ligature to the vessels to stop the bleeding, wash often with chloride of lime dissolved in water, and apply tincture of benzoine with a feather; continue until the parts get well.

"Cows that have once had inflammation of the udder—unless particular attention is paid to them before or after calving, or even sudden changes of the weather from warm to cold rainy—are very liable to be again attacked. We should advise all such not to be put to the bull, but 'dried,' fattened, and sold to the butcher, instead of being, as is too often the case, got in pretty good condition, and sent to the fair or market, to be sold as in-calf cows. But a proper examination of the udder would detect if such had been the case. A part of the udder will be harder than others, and feel colder; short, hard cords or lumps, as it were, will be felt; but the farmer who is guided or ruled by these simple instructions in this and other diseases, as preventives, will seldom or ever be plagued with these diseases in their alarming stages.

"*Wounds in the udder* are often caused by the horns of others, or in getting over the fences. Keep the parts clean by fomentations; apply digestive ointment if deep; if superficial, tinct. benzoine, however simple; if the cow has been raking much about, never omit a dose of purging medicine.

"We shall now make a few remarks on the

"UTERUS, *i.e.* WOMB.

"It sometimes happens that in the violent straining to expel the calf the womb is shortly after expelled, or as it is termed, *inversion of the womb* is brought about; or, vulgarly, the *calf bed is said to be fallen down.* In such a case a skilful practitioner should at once be sent for; but a few hints may, nevertheless, not be amiss. In the first place, have two men to support the womb with a large towel or sheet; next, carefully clean away all dirt, and remove the after-birth or placenta, if still adhering, carefully and gently. After you have it all nicely cleaned, raise the cow's hind parts by placing plenty of straw, or what is better, dry manure, under the feet, until you have her considerably higher behind than before, the assistants all the while supporting the womb. They will then raise it up on a level with the bearing; first have the hands well greased, and then endeavour with the palms of the hands to force it back; or forcing firmly but gently with one hand, keeping the other as a support behind, at the same time pressing. The cow should be firmly held by the nose and horn; it keeps her quiet, and prevents her straining so much.* After its return make a temporary truss with the sheet, by placing a girth round her neck in the form of a collar, one end of the sheet tied to it along the back, the other under the belly. An assistant should in the meantime be pressing the tail hard down with a cloth under, as it is very apt to return; next bleed, and rather largely. Give no other food but bran mashes. In the course of twenty-four hours, give a dose of physic if the bowels seem costive; in fact we generally administer it after the bleeding; but then we always have a proper truss for the purpose applied directly, so are not afraid of any after straining. To allow the urine and fæces to escape, cut a few small holes in the sheet. Sometimes, after the cow has calved naturally and quietly, the placenta or after-birth is retained. There is nothing in such a case to feel anxious about. If there should be any feverish symptoms, bleed and give a strong dose of purging medicine; if bleeding is not required, give the purging medicine, and *nothing else,* with the exception of the ginger. If retained till it smells, inject gently a little warm water in which some chloride of lime is dissolved, and when she strains to expel the injection, gently pull the parts, repeating occasionally until expelled. Keep the bowels open, and all will soon be well.

"One would think that inflammation of the womb, and that of a violent character, would be apt to set in after such mishaps, but seldom is such the case, no doubt from the treatment at the time acting as a preventive; but where parturition has been difficult, or the animal has been too early exposed to cold wet weather, and, as is too often the case, where those abominable so-called 'comforting drinks' have been given, inflammation often takes place, perhaps about a week after calving. The symptoms are severe straining, as if calving, at intervals; seldom lying down, or if lying down, straining, and quickly up again. If you loose her she is disinclined to come out or turn round, staring, coat or hair standing up, with rough feel; pulse much quickened; respiration hurried; rumination suspended; lifting up the hind legs, first one, then the other; much pain on pressing the flank, and causing straining; bowels costive; urinary discharge natural, but at times a straining after; muzzle hot and dry; roots of ears and horns hot.

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* "If the straining continue severely, you might give tincture of opium 2 oz, or powdered opium 2 drachms; but in all cases we have attended, and they have been numerous, we found the bleeding all sufficient. Laceration or rupture may sometimes take place; in such cases the practitioner must be called in. However, if you can return it, do so. Apply no stitches, bleed and physic well, and give sedatives.

"Treatment:—Bleeding, and largely. Physic, repeating till the bowels are opened; sedatives, with the addition of extract of belladonna, 2 drachms, acetated liquor of ammonia (*i.e.* mindererus spirit) 2 to 4 oz., and apply a large mustard cataplasm. Well rub in from the spine right down the side—right, or off side. When the bowels are well opened, continue the sedatives for some days dissolved in chamomile tea until all feverish symptoms disappear. Diet—boiled food, linseed, bran mash, keeping the state of the bowels in view, and be careful not to turn the animal out too soon in cold or wet.

"We shall now make a few remarks on

"SKIN DISEASES.

"*Mange.*—The symptoms are so well known we need not describe them. After the bowels are well opened, give daily for some days the following—

Sulphur	2 ounces.
Nitre	4 drachms.
Antimonial powder	2 „

Dissolved in gruel.

Then well rub in with a softish brush—

Linseed oil	1 pint.
Sulphur	½ pound.
Oil of tar	1 pint.
Turpentine	4 ounces.

In the course of two days well wash with soft soap and warm water. If not thoroughly cured, repeat the dressing. This will answer also for the horse, and for the foot-rot in sheep.

"*Lousiness* is often the accompaniment of poverty. Liberal feeding will often cause the disappearance of the disgusting insects; if not, a good dressing with any kind of oil, and then washing as above. The above is also, in most cases, the forerunner of mange. In cases where they are very annoying to the animal, with much rubbing, you may treat externally as for mange, and with liberal good feeding.

"*Foul in the foot* generally arises from the irritation of hard substances, such as gravel or stones getting lodged between the cloots, or from treading on sharp stumps of wood, nails, &c. A foul in the foot, when neglected, becomes very formidable to cure, and requires the assistance of a skilful practitioner. When the animal is perceived lame, however slight, have her up, well wash and examine the parts, apply a poultice of bran, boiled mashed turnips. If the case is simply excoriation between the cloots, apply some tincture, as benzoine, aloes, or myrrh, and then bind up with hot tar and tow; if the disease has got deep seated, all loose horn must be cut away, the diseased parts freely exposed, and to any fungous or cancerous parts freely apply the butyrine of antimony; then apply hot tar and tow as above, keeping it in its place with a bit of cloth in which are two holes for the cloots to go through; bring the ends up, and tie round the pastern. A favourite mixture of ours in such cases, and of specific efficacy, is from Morton's 'Manual of Veterinary Pharmacy,' as follows:—

'Corrosive sublimate	1 ounce.
Spirit of salt	1 „
Spirits of wine, rectified . . .	7 „

Dissolve the sublimate in the salt, then add spirits. Apply the tar as above.'

"In neglected cases one's patience is sadly tried; but persevering treatment, poulticing, freely exposing the diseased parts by paring away the horn, and dressing with the solution to keep down the fungus, &c., not forgetting the usual dose occasionally of purging medicine, will generally work a cure.

"Bulls are very subject to *gonorrhœa, i.e. Bull Burn*, and which is communicated to the cow. It may arise from various causes. The symptoms are, in the bull, swelling and inflammation of the sheath, with discharge of thin blackish or purulent matter; in the cow, swelling and inflammation of the parts, with a similar discharge.

"Treatment:—Physic, and if the animal is in full condition, or much irritation existing, bleed, and inject up the sheath, and in vagina, *i.e.* shape, the following lotion three times a day, at the same time first syringing with some hot water:—

Sugar of lead	2 ounces.
Sulphate of zinc	2 „
Water	2 quarts.

Or,

Sulphate of copper	2 ounces.
Water	2 quarts.

In neglected cases of the male I have had to lay open the sheath, and amputate from four to six inches of the penis.

"In concluding these hints on the early symptoms and treatment of the ordinary diseases of cattle, we are quite aware as to their imperfections, in not being perhaps more elaborate in particularising the changing symptoms and various treatments required, &c.; but these are points that must be gained by practice—they cannot be understood thoroughly by reading of itself alone, without being aided by occular demonstration. We have, however, endeavoured to give as briefly, and and in as clear a manner as possible, what may be called 'a few popular hints,' likely to be interesting and useful to the general reader—hints which are designed to be more suggestive than exhaustive."

In the pages of the Journal of the Royal Agricultural Society of England, some exceedingly valuable papers are to be met with, on the diseases and what may be called the health-management of cattle; those by Mr. Bowly, Mr. Wright, Mr. Bowick, and Major McClintock being specially noteworthy. We prepared—of the papers of these authorities—a *résumé* for a series of articles in the *Journal of Agriculture;* and this, by the kind permission of the proprietors, we are enabled to reproduce here, and with which we conclude the present chapter.

"In the prevention of disease, Mr. Bowly places great stress on the importance of securing cleanliness. For this end the cattle should be—he recommends—occasionally scrubbed with a brush made of whalebone, particularly on those parts beyond the reach of the animal's tongue. Whatever benefit there is from the animal licking itself, as here hinted at, there is doubtless a danger arising from the habit; that is, in cases where this is the only means allowed for securing the cleanliness of the animal. At certain seasons, and in certain conditions of health, the hair comes off the animal's coat in great abundance. When the animal licks itself, this is taken off by the tongue, and much of it finds its way to the stomach, where there is a chance of its ultimately being formed into hard, indigestible pellets of hair. Now, this may be prevented by brushing, in the way Mr. Bowly recommends, or by using the curry-comb. This should be done regularly, and more especially and carefully at the periods when the cattle are casting their hair; at which time an unusual irritation of the skin prompts the animal to lick itself with greater frequency and persistency than on ordinary occasions. By carrying on brushing this irritation is not only eased, but the falling-off hair is removed beyond the possibility of its being taken up by the tongue of the animal. It may seem a piece of over-refinement thus to brush or curry-comb the cattle, but there is no doubt of its exceeding utility when done properly and judiciously. We say this, because in this as in all other departments of work, there are two ways of doing the work, a right way and a wrong way; and when cattle do not take to the brushing or curry-combing kindly, it is because it is not properly done. When the thing is done roughly, the comb being dug in with savage energy, or brought smartly and frequently in contact with bones and projecting joints, it is no wonder that the animal becomes restive, and shows, by unequivocal signs, that it disapproves of the rough and painful process; but let the 'spiriting be done gently,' and then see how pleasantly and gratefully the animal receives the combing or brushing.

We say gratefully, for it is quite impossible to mistake the pleasing evidences of gratitude given by an animal kindly treated. Those who are harsh, if not positively cruel to their animals, little know the loss they sustain by it, a loss which tells more than one way.

"When young animals are troubled with lice, a nuisance to which they are often subjected, the lice should be destroyed at once. Mr. Bowly finds a strong decoction of tobacco the best wash to use for this purpose. Whenever a slight indisposition shows itself, no matter how slight, let this make you, as Mr. Bowly remarks, 'suspicious of evil;' to obviate which, lose no time in giving the animal a drench. This, when composed of 1 lb. of salts, with 1 oz. each of ginger and nitre, is found to be effective in restoring the animal to health.

"The disorders or diseases to which young cattle are subject should be attended to at once. The first malady to which a calf is liable is 'scour;' this generally comes on when it is two or three days old, and is caused by too great acidity in the stomach. A post-mortem examination of a calf which has died from this disease will show the curdled milk in the stomach in the form of a hard mass, so hard in some instances that a knife will scarcely cut it. Now, unless this hardened curdle of the milk is prevented, or when formed, acted upon by the alkalies and other medicines, death will speedily ensue. Mr. Bowly has restored calves suffering from this complaint by administering a dose of magnesia and rhubarb, of each a teaspoonful, and along with 20 grains of grey powder; the dose to be repeated every six hours. Prevention is, however, says Mr. Bowly, better than cure, in this as in other affections; and to prevent, he is in the habit of giving to each calf, as soon as it is dropped, and before sucking the cow, a dose composed of rhubarb, magnesia, and castor oil, of each a teaspoonful; this is repeated if necessary. At the same time a common cleansing draught is given to the cow. This treatment has been so successful, that since adopted Mr. Bowly has not lost a single calf. The scour frequently attacks calves of a more advanced age. It is generally caused by cold. If taken in time, a dose of from 4 to 6 oz. of Epsom salts, $\frac{1}{4}$ oz. of ginger, and the same of nitre, will usually cure the complaint. Mr. Bowly is of opinion that all the astringent medicines used are injurious to the calves.

"Another complaint attacking calves is called the 'husk,' from the constant short cough accompanying it. It makes its appearance in the autumn, when about eight to nine months old. The cause of this complaint are parasites, or small worms, which attach themselves to the windpipe, and, if the disease is allowed to run on, ultimately extend to the lungs. For slight attacks, or for attacks in the first stages, a daily application of tar to the noses of the animals affected, by raising an effluvium obnoxious to the parasites, acts as a sufficient cure. Men of experience say that the most certain cure is 'half a teaspoonful of chopped savin, with half a pint of strong decoction of wormwood, given to each calf for three successive mornings, after fasting the night; then waiting three mornings, then repeating this treatment; suspending the doses again for the same time, then giving three more, making in the whole nine doses.' Mr. Bowly is of opinion that this affection is often caused by the calves not being provided with sufficiently nutritious food after they are weaned, or the milk diet is discontinued; and also from keeping too many together, as he has found large herds to suffer more from husk than small ones.

"A serious complaint from which young cattle suffer is the 'murrain,' the 'quarter ill,' 'black leg, or quarter,' for by all these names is it known. This attacks them in the spring, when about eighteen to twenty months old. The most generally received cure, or rather preventive of this disease, and one which is pretty universally admitted to be efficacious, is putting a seton through the dewlap. Mr. Bowly thinks it is caused by stinting the food during the winter, followed by a too rapid thriving on being put to grass. He is of opinion that, as the malady thus proceeds from a fulness of blood, aperient medicines given at intervals during the spring will prove of advantage.

"Such is the general treatment, by following which Mr. Bowly has secured in his herd, to a remarkable degree, 'regular fecundity and successful gestation;' so much so, that during a practice of twenty-two years, he has only had about 2 per cent. of cows which did not at their regular time safely and easily calve. He has also been as fortunate in getting his cows to prove in calf in seasonable time; and on this point he draws attention to a remedy which is said to be certain to secure the conception of a cow. Although having the knowledge of this for nearly twenty years, Mr. Bowly never had occasion to put it into practice till last year (1857), and he thus describes it: 'It consists in removing the clitoris from the vulva, which may either be done with caustic or the knife; the latter was used in this case. The cow operated on produced twins in July, 1856, and was served by the bull within the usual time, but did not stand; and became what is called a "perpetual buller;" that is, always in a state to take the bull, which is generally considered a most hopeless case. She is a very favourite cow, and I was unwilling to subject her to what I supposed would be considerable suffering, therefore I delayed the operation till last July, and was glad to find that it caused little pain or inconvenience. It was performed immediately after the cow had been served by the bull. She took the bull again in three weeks, and has since produced a heifer calf at the proper time. I gained my information on this subject from the late Mr. Pegler, of Stow-on-the-Wold, a man of great experience and judgment in all agricultural matters; and he observed it in practice during an agricultural tour in Ireland, where it was considered certain to produce the desired effect. If it can be fully relied on (and this case of my own is so far confirmatory), it is of great value to the breeder.' While detailing the treatment which he has found to secure successful gestation, Mr. Bowly takes up the consideration of the 'causes which operate adversely to regular fecundity and successful gestation in particular seasons.' To trace or point out these causes, Mr. Bowly admits to be exceedingly difficult, arising chiefly from the state of the atmosphere, an element so uncertain in its effects, and so disturbing in its operation, and which, although in many cases undoubtedly affecting the health of the stock, is so very occult, that we can do little either in discovering them, or in providing against its effects. Mr. Bowly, however, at the same time, inclines to the opinion, that many disasters are attributed to the influence of the season which are, in point of fact, owing entirely, or at least mainly, to the carelessness or the oversight of the breeder. Mr. Bowly does not think that abortion is contagious in the strictly medical sense of the term ; but is at one with Mr. Wright, whose opinion on this subject we have already given, that a 'nervous sympathy' exists between cows, which causes others to be influenced by one which may have happened to slip her calf. He therefore recommends that in this case the cow having the misfortune should be separated at once from the rest of the herd.

"To secure all the certainty and regularity so desirable in a herd of breeding cattle, Mr. Bowly believes that much may be done by following the treatment he has detailed; and he is confirmed in this belief, from observing and hearing of the results of different treatment in other herds. At the same time, he is not unaware that there are undoubtedly bad seasons for herds, just as there are bad ones for flocks; and that, moreover, there is in some seasons a predominance of one sex over the other; noticing a case recorded by the observant author of the 'Journal of a Naturalist,' where in a very large district, 'many miles around,' scarcely was a single female calf born in the year. Mr. Bowly alludes to this, and analogous cases, as remarkable facts of interest and importance to breeders of cattle, but which, so far as his judgment goes, cannot be prevented or provided against by any means which he has not detailed.

"If Mr. Bowly's mode of treatment involves the use of medicine as a preventive in more cases than one, and administered with regularity, Mr. Wright's mode is as remarkable for involving, or rather dispensing with the use of it at all; or at all events in very rare cases. 'I have,' he says, 'almost abandoned the use of physic after a cow has calved as uncalled for, unless there are unhealthy symptoms; for the less nature is tampered with the better, so long as its processes go forward regularly.' During the summer, and while the cattle are out grazing, they are not so liable to constipation or indigestion as when confined to the house or under shelter, when dry food is the chief aliment, and straw forms no small proportion of it. For winter feeding we have found that the addition of a little oil-cake every day to their food keeps the bowels regular. Failing oil-cake, and if a supply of cabbages is obtainable, a good feed daily of this vegetable we have found of excellent use in keeping the bowels open to a healthy degree. Bran or malt-combs also mixed in thin cut hay, and the whole well steamed, we have also found beneficial in this way. But to return to Mr. Wright's remarks on diseases. 'When any symptoms of fever appear, it will be found,' he remarks, 'that a dose of ½ lb. of coarse Epsom salts, with 1 lb. of treacle, and a tablespoonful of ginger, is a safe and useful medicine, and may be repeated after a day's interval, as a simple and generally efficacious remedy. A watchful eye in the herdsman will often discover an ailment, which, if nipped in the bud, prevents the commencement or spread of disease. And although I by no means wish to convey the idea that this is a "cure-all," or that the services of the intelligent practitioner may be altogether dispensed with, yet much may be done to make his visits less frequent than they otherwise would be. As regards diet, I may say that I have tried almost every known "food for cattle"—excepting indeed those kinds so often advertised under this especial title, which I always studiously avoid—and I have judged for myself upon the relative qualities of the different articles used, such as locust beans, maize, pulse, corn, and cake.' Upon the subject of oil-cake as food, Mr. Wright has much to say, which may be resolved into this, that it is of essential importance to have pure oil-cake, free from adulterating materials, and that he should secure this purity if he can. We are, however, inclined to think, that in view of the numerous snares by which the purchaser of pure oil-cake is beset—and that with the mixture of the seeds of wild rape, of chadock, of dodder, of millet, and of willow-weed, all so unscrupulously used by makers—he has so little chance of securing this purity, that he will be a saver in the long run if he grows or purchases the seed himself, using it in the shape of a mucilage.

"For *scour*, and other ailments which calves are liable to, Mr. Bowick expresses his high opinion of the value of *Day's Gaseous Fluid!* Since using this he has not lost a single calf, neither can he refer to a calf having had an attack of scouring which continued a couple of hours, nor to one instance of the succeeding meal being refused, however much may have been the loss of appetite previously. Mr. Bowick's remarks on this disease and its cure, as sent to *Bell's Weekly Messenger*, may here be useful to the reader.

"'Remedies,' says Mr. Bowick, 'for the above ailment are often local and empirical; it is far better to treat it constitutionally. In short, "remove the cause and the effect will cease." But unfortunately several details are wanting from which to form a judgment, or make a profitable suggestion. Diarrhœa in calves may, and often does, arise from very diverse, and frequently what may be called trivial causes. These causes, as operating on the little animal, are either external or internal. If the former, we should be disposed closely to examine the feeding of the cows, and to put a few queries respecting the same. For instance, are the mangolds carefully cleaned? Adhering soil tends to scour the cows in a moderate degree, and of course the action is much more serious on the calf. It so happens that the complaint from which "An Old Subscriber" suffers, has this season been particularly prevalent from the very fact indicated. The small mangold roots of 1860 have been much more difficult to clean, and have consequently carried more soil with them to the feeding troughs, than in the average of seasons. Their use should cease entirely with those cows that are suckling, unless this has been already done. Again, is the cake a genuine article? How has it affected the fatting beasts? Is there no irritant contained in it? And what kind of meal is referred to, that of barley or beans? We should very heartily urge the use of the latter in preference to the former for nursing cows. Again, do the calves suck their own mothers? A mistake is often committed in putting a young calf to a cow which has been some months in milk. This should not be done before the calf is a fortnight old, and even then with much caution. As to external causes of diarrhœa, a close, ill-ventilated, dirty, or damp calf-house, may be reckoned the chief. The owner would do well to have the house carefully examined; wash it out, and then try the floor with a pocket level. If the fall is less than one inch to the yard, the bricklayer must be had to remedy the defect. Calves void a large quantity of urine in proportion to their size, and ample provision must be made for carrying it off freely. Let them also be well littered down twice a-day, with wheat straw. the boltens cut through the middle, and the straw shaken up together. Encourage them to eat a littlo sweet green hay from a rick before them, and also a few sliced roots as soon as they take to them.

" 'But, for immediate action, if the scourge still continues. Watch the premonitory symptoms, feverishness, and refusal of food. Remove the affected animal to a warm place, and tie a cloth round the body, which will tend to keep up the vital powers. Give a dose of 2 oz. of castor-oil, with half a teaspoonful of ground ginger, and a whisked egg. This will remove the offending or irritating matter; and then follow up with the free use of "Day's Gaseous Fluid," according to directions on the bottle. Or, if castor-oil is not at hand, give about 3 oz. of common salt, in a little wheaten flour gruel. And if the bowels still continue relaxed, and the evacuations too watery, the calf must be drenched twice a day with well boiled and thickened wheaten gruel. But do not continue its use longer than is needful. It is well that nature be allowed to help herself a little. Before returning the animal to the calf-house, let the house be well flushed out and washed down with water, containing an ounce to the gallon of chloride of lime. This will remove any offensive taint or smell—a precaution very essential for the well-being of calves. In conclusion, be not persuaded to employ strong astringent medicines; and do not rest satisfied with rearing less than every calf which is in a sound healthy condition at birth.'

"Major McClintock, in his prize essay on rearing calves, gives brief remarks on the diseases of calves, to which we deem it useful here to draw attention. On the disease of *scour*, referred to in the above, he states, that so long as we observe the calf playful and lively, and taking its milk freely, we need not be alarmed at its evacuations. Most practitioners recommend a mild purgative, in the first instance, to remove the acidity and irritation of the bowels, after which the simple doses of from ½ to ¾ oz. of tincture of rhubarb, with an equal quantity of water. On the appearance of looseness of the bowels, Major McClintock at once reduces the quantity of milk, and keeps the animal warm and quiet;

and gives an astringent drink of starch, laudanum 1 drachm, ginger 1½ drachm. Should the disease continue, and assume a threatening appearance, or the evacuations be white and tinged with blood, 5 grains of sulphate of copper, and 2 of opium, given four times a day, will be found an excellent remedy. Major McClintock states that he finds the matter evacuated irritates the anus very much; and that by keeping this clean, by spunging with warm water, the irritation is greatly relieved.

"On the subject of *navel ill*, the same authority has also some remarks. The examination of the naval string, after the calf is dropped, is the first care of the attendant, who should not be satisfied if it has a raw and sore appearance, or if blood drops from it. Mr. Youatt gives the following advice, which is quoted by Major McClintock: 'A ligature should be passed close round it, but, if it can be avoided, not too close to the belly. Possibly the spot at which the division took place may be more than usually sore. A pledget of tow, well wetted with Friar's balsam, should be placed over it, confined with a bandage, and changed morning and night; *but the caustic applications that are so frequently resorted to should be avoided.* Fomentation in the part in order to disperse the tumour, the opening of it with a lancet if it evidently *points*, and the administration of two or three ounce doses of castor-oil, made into an emulsion by means of an egg, will constitute the first treatment; but if, when the inflammation abates, extreme weakness should come on, as is too often the case, gentian and laudanum, with perhaps a small quantity of port wine, should be administered.'

"The *hoose*, or *catarrh*, is a disease to which calves are very liable. Great care should be taken to prevent this disease breaking-out, as it runs its course even quicker than with grown-up cattle, and occasionally assumes an epidemic type. It is usually most prevalent in the spring and autumn, doubtless from the extremes of temperature met with at those periods. A uniform temperature in the calf-houses, good food, careful cleaning, and efficient ventilation, are the best preventives; the converse of this state of matters, the most prevalent cause of disease. The first cough heard should be the signal for the display of unceasing vigilance on the part of the attendant. Cows are too often allowed to cough from week to week, till the disease reaches the chest, affects the lungs, and lays the foundation for a consumption, generally fatal. Youatt points out, very briefly and very plainly, how the condition of the animal may be ascertained, and how it should be treated if under the disease:—

"'Let the animal be taken up and examined. Does she feed as well as ever? Does the dew stand upon her muzzle? Are her flanks perfectly quiet? Then one or two nights' housing, and a mash or two, or a dose of physic, may set all right. But if on examination the muzzle is a little dry, and the root of the horn hot, and she heaves (although not much) at the flanks, and the coat is not so sleek as usual, and she is a little off her feed, let her be bled. Experience will teach the farmer that these chest affections in cattle often, and speedily, assume a highly inflammable character, and that they must be conquered at first or not at all.'

"Major McClintock states that he has found, in the first stage of common catarrh or cold, a little nitre given at night in a bran-mash have an excellent effect. This is very useful in allaying inflammatory symptoms, and in acting mildly on the kidneys; 2 drachms will be sufficient for an ordinary calf. We may mention here that, as a medicine for cows and calves 'out of sorts'—a phrase which indicates sufficiently symptoms which, not attended to, may go on to serious diseases—we have found nitre, common Epsom salts, ginger, and sulphur most excellent. We have removed speedily, not only symptoms, but alarming ones, by the timely administration of this useful medicine. Where nitre or sulphur is administered, it is necessary to keep the animal well sheltered and warm, as there is an increased liability, under their action, to catch cold. If the cough should not yield to a few doses of this simple kind, tartar emetic and digitalis should, says Major McClintock, be added; these, he states, are most valuable medicines where fever is present. A most severe case of inflammation was most successfully combated by the administration of frequent but small doses of these medicines, without having recourse to bleeding.

"Of *quarter ill, black quarter, joint murrain,* for by all these and other names is the disease which they indicate called, Major McClintock has some remarks. Inflammatory fever would, according to this authority, best describe the malady. So sudden are its visitations, that the beast in perfect health to-day may be found drooping and out of sorts to-morrow. The fever it suffers is indicated by the heated breath, the heaving flank, the dry muzzle, quick pulse, and anxious, disturbed, and uneasy looks. A languor attacks and bears down the energies of the poor animal; it objects to move; and if made to do so the gait is unsteady, particularly in the hind-quarters, and the distress of the animal finds a vent in painful moaning and laborious breathing. But as the disease progresses uneasiness increases, and a constant shifting of posture or position shows how difficult it is for ease to be obtained. This ends in an apparent unconsciousness of surrounding objects; weakness in the extreme gradually comes on, till ability no longer seconds the desire to rise and be restless; and at last the struggle is over. The worst sign in an animal taken with this disease, is a tenderness in the back and loins, along with swelling, and which yields to the least touch. When these signs are observable it may be feared that decomposition has set in. Ulcers may appear in different parts of the body, particularly in the mouth; the urine is discoloured, dark, and may be bloody. In the treatment of this disease, the animal is first to be housed and bled. Bleeding, however, in the general treatment of cattle, Major McClintock objects to. After the bleeding a purge of Epsom salts should be given, and repeated if necessary. Careful watching at this stage of the treatment is indispensable, so that the least change can be noted by the attendant. If the change is favourable, doses of digitalis, tartar emetic, and nitre should be administered twice or thrice a day. Hot water fomentations should be used for swellings of joints, and a liniment be used for rubbing them; this liniment being composed of equal parts of camphorated spirits of wine, spirit of hartshorn, and turpentine. As a disinfectant, the ulcers, if any, should be washed with chloride of lime in solution several times a-day; ½ oz. of the chloride of lime to a quart of water will make a good disinfectant lotion. Major McClintock is disposed to attribute his immunity from loss by quarter-ill to proper feeding and housing, and to the use of a seton, which he puts through the calf's dewlap towards the end of January. The use of oil-cake is valuable in keeping the bowels regular. With reference to the placing of a seton in the dewlap, Major McClintock believes that the plan is an important one, and all the more necessary to be attended to the higher the animal is forced in feeding. The seton is passed through the loose skin of the chest, care being taken not to place it too far down, as this would cause, from the pain, much inconvenience to the animal in laying down. The hair of a cow's tail twisted to the thickness of a finger, with a knot at one end and a wooden button at the other, makes a seton. Before inserting it, the seton should be well smeared with Venice turpentine, to cause it to act quickly. The seton should be drawn from the button to the knot, or *vice versa*, daily. Black hellebore may also be used as a seton. Mr. Youatt has some excellent remarks on the use of the seton which may be useful here. They 'excite inflammation in the neighbourhood of the diseased part, and thus lessening the original one, and causing a determination of blood, to a greater or less extent, to this new seat of irritation, they are useful both in acute and chronic inflammation of the respiratory organs. In young cattle rapidly thriving, and placed in pasture perhaps a little too luxuriant, permanent setons are highly beneficial; they act as a salutary drain, and prevent that accumulation of the circulating fluid which is the usual cause of inflammatory fever, and other fatal complaints.'

"Major McClintock concludes his valuable essay, by drawing attention to the importance of having the stock-houses properly constructed, so as to secure plenty of light and fresh air. He is rather an advocate for light being admitted from the roof, or at least sufficiently high to prevent the animal standing at 'gaze,' and thus getting restless and uneasy."

CHAPTER II.

DISEASES OF SHEEP.

THERE is no department connected with the practice of stock farming so little understood by farmers as the diseases of sheep; those of cattle and horses are comparatively easily understood. At any rate, the symptoms the latter present do point pretty clearly to the diseases the animals are afflicted, or about to be afflicted, with. Not so with sheep; they are often taken suddenly and seriously ill, and offer few or no symptoms by which the treatment to be pursued is indicated. There are a few, however, which are comparatively easily known, and comparatively easily treated. To these we shall only direct attention, leaving those more complicated diseases for other and more elaborate treatises to discuss and decide.

Diarrhœa is usually caused in lambs in consequence of a change of food from the grass to the winter turnips. It is also caused by giving them too succulent food after weaning. The first thing to be attended to, if the disease is observed in its first stage, is to keep the animal upon warmer or drier food; if it has run for some time, the animals should be taken up to shed or shelter, kept warm, supplied with dry food, have their bowels well cleansed out with a dose of 1 oz. of castor-oil in a pint of gruel, and to which, if the animal is much pained, 20 drops of laudanum should be added. The following is a recipe for the complaint:—

"4 oz. of logwood, 1 drachm of the extract of catechu, and 2 drachms of cinnamon, mixed with 3 pints of water, boiled for a quarter of an hour; strain it off, then add 60 drops of laudanum. Give half a pint night and morning as long as the flux continues."

Dysentery is often classed with diarrhœa, but good authorities claim the two diseases to be essentially distinct. Dysentery is dangerous from the commencement, whereas diarrhœa is not so, and may be often easily checked. The following remarks by Mr. R. Smith on this disease will be useful:—

"To effect a cure, a reaction or perfect change in the system is necessary, and may be best produced by exciting the action of the skin. To effect this the animal should be immersed in a tub of hot water for fifteen minutes, then given 1 oz. of castor-oil, with 30 drops of laudanum, in a little gruel, taking care that the animal be kept warm by wrapping and placed in a warm shed. As the animal recovers, give gruel freely, with a more moderate dose of the above. When the appetite returns, give mixed food, such as hay and vegetables. During this disease care should be taken not to pull the wool, as it frequently falls off. A change of pasture, and not run too thick, is the best preventive. I have also found either of the following receipts to stay its ravages when given in time. They may be adopted when parties reject the hot water plan, with equal success:—No. 1. 4 tablespoonfuls of common salt, 1 teaspoonful of turpentine, mixed with a little water, and repeated in a milder dose. No. 2. 1 teaspoonful of laudanum, 1 tablespoonful of either gin or rum, well mixed, and given. Repeat the dose if necessary, or in a milder form. No. 3. 1 ounce of alum in half a pint of warm water.

"The above three receipts will also stay the progress of the diarrhœa in lambs."

The same authority remarks on another disease to which sheep are subject:—

The Scab:—" The mercurial ointment in common use prepared by the druggists, is found to be sufficiently good, without resorting to other receipts. When ordered, the party should take care to name that it is required for the specific purpose of curing the disease, that attention may be specially paid to the grinding of the quicksilver. In mild cases, one dressing by an experienced shepherd, at the rate of 3 lbs. to the score of full-grown sheep, and 2½ lbs. for younger ones, will prove sufficient, plenty of shreds being the principal feature, and also observing to dress the points pretty freely; care should be taken to shut them up for one or more nights, according to the case, and afterwards kept in a warmer situation if possible for a time, and given a good supply of food. In bad cases, it is proper to inspect them weekly, until the disease be entirely removed, and give open medicine pretty freely. Should any die under the operation, the remainder should be washed immediately; if the disease do not then stop, they should be shorn, which is a certain remedy.

The Rot.—" The following simple receipt, given for three or four mornings *fasting*, has proved of great value, and is the best (out of the many) I have met with :—1½ oz. of common salt, with three-fourths of a pint of water, well mixed before use. In one experiment, a sheep being killed one week after this dose had been given, 120 flukes were taken out of its liver, most of which were dead. In support of this it is well known that sheep never have flukes when pastured upon the salt marshes."

Sore Heads and Fly-galls.—" These are troublesome complaints, which are much better avoided than cured.

In woodland situations, *capping* at an early period is decidedly the best plan, but it should not be done later than the first of June, or when the sheep are shorn; then by attention to keep the caps on their heads, very little annoyance will be experienced; but *never* place a cap upon a *sore* head. When this plan is not adopted, the heads and flanks of the whole flock should be dressed with a mixture or preparation of the dregs of whale oil and brimstone, sufficiently thick for use to be applied with a round brush from a suitable tin or pot. My practice is to clip the flock early, and then dip them at once with Bigg's composition, before they are affected with the flies, and apply the preparation to their heads, which is repeated every fortnight to the heads and flanks during the fly time; they are kept by this plan perfectly clean. When fly-galls have commenced, a small quantity of spirits of tar may be mixed with the brimstone and whale oil, and applied to the parts. When they are very bad, a plaster of the following preparation will be found useful:—Horse turpentine, tar, and wheat flour, well mixed together."

Sturdy.—Sheep affected by this disease get a dull stupid look, turn round, and frequently fall. When this disease affects sheep in good condition, they should be sold at once; but where this cannot be done, the hyatid, or worm in the brain, should be removed, which can now be done with comparative ease by an instrument invented for the purpose, and the use of which has been remarkably successful.

The *foot-rot*, or *halt*, is a disease attacking sheep fed upon wet, marshy pastures. The following is a recipe (p. 155) for this. On being attacked the animals should be placed under cover, with plenty of clean litter to tread upon; their feet should then be examined and the ointment applied. It is essential that the removal of the disease should be complete in each case, for if a particle of the matter should remain, the disease will again commence its ravages.

The following will be useful in connection with this disease:—"In the first place, it is useless placing sheep thus affected on turnips, which they cannot possibly gnaw. It is best to keep them where they can pick a little sweet grass, and if they can be made to take any soft food it will not do them harm, though for the first two or three days of the disease, as there is considerable pain and fever, low diet is not disadvantageous. Many of the animals are greatly benefited by a mild purge, or a dose or two of common nitre water, or in a little food. Mild astringent lotions can be used for the mouth and feet, and, so far as the latter are concerned, the careful attention of the shepherd, and, when possible, of a veterinarian, is much required. We have to caution shepherds against paring too much. We have seen animals severely lamed and permanently injured by the tips of each toe being cut off, and in some instances we have seen sheep thus mangled bleed severely for twenty-four hours, weakening them much, and greatly retarding recovery. Proper paring of the feet is much required, but every care should be exercised so as to leave an animal with a level bearing surface to touch the ground. In many instances the hoofs are thrown off—in some cases entirely, and in others partially. Sheep are found to be very lame where new hoofs are forming beneath old ones which are not properly cast, and it is a rule that when any considerable portion of horn is detached it must be cut away. If this is not done earth and water accumulate in the recesses so as to soften and destroy the newly forming horn, and the foundation is thus laid for a peculiarly severe 'foot-rot,' as the shepherds call it.

"In paring the feet of sheep there is almost invariably much clumsiness manifested. The knives used are usually ill adapted for the purpose, and rarely sharp. The horn is cut into deeply, the toes are much shortened, and it sometimes takes three months before a sheep can walk and stand with comfort. On the hills, when the hoof is usually kept hard and worn, there is not much necessity for paring sheep's feet; but on lowland, and especially on damp pasture, the rugged edges of the horn overlap, the distortion of the foot is great, and the animal cannot implant it fairly on the ground."

Treatment:—"1 oz. of corrosive sublimate, 1 oz. blue vitriol, 1 oz. spirits of salt, 1 oz. verdigris, 1 oz. horse turpentine, 1 oz. oil of vitriol, $\frac{3}{4}$ oz. spirits of turpentine, and 4 oz. sheep ointment. To be well mixed when prepared, and kept tied down when not in use."

The following remarks on diseases of ewes and lambs, from the pages of the *Scottish Farmer*, will be useful:—

"*Abortion.*—Every season the most fortunate farmer must expect a few slips; but we are acquainted with some of the finest lands in Scotland in which abortion has prevailed considerably of late. This cannot be attributed to ergot, or to bad management of food or stock. Some shepherds consider abortion contagious; but in times past one or two ewes might slip, and no more suffer. We believe that the accidents are this year to be accounted for by the extraordinary number of twins, triplets, and even quadruplets. The ewes have been too full, and where the ground has been hilly, so as to favour pressure on the mouth of the womb in certain positions, many cases of premature labour and abortion have occurred. That we are correct in this opinion is demonstrated by the fact that the accidents have been all close to lambing time, commencing six or eight weeks before the period, and increasing until the normal births of lambs occurred. Ergotism, contagion, and other such causes operate in producing abortion at any period of pregnancy.

"*Eversion of the Womb.*—Amongst the most troublesome precursors to the period of parturition may be noted the protrusion of the pregnant womb. There are farms and special fields, there are seasons and peculiar stocks, that are especially prone to this accident. The farms and fields are of the most hilly; the seasons influence little, so far as weather and crops are concerned, but are noticed in consequence of the most hilly fields on a farm being those on which turnips have been grown, and in which ewes have been kept an unusually long time. So far as stock being specially prone to eversion of the uterus is concerned, we have found more in the large, well-bred animals than in the hardy and smaller mountain sheep; but the same stock will suffer very differently under very varying circumstances.

"Whenever any of the ewes are observed with the lesion they must be removed to low ground, and the organ returned. In some districts shepherds have found little more was needed than to wash the external organs frequently with a solution of alum, so as to favour their contraction. On other farms the plan of skewering is employed with great success; the lips of the vulva are transfixed with strong skewers or metallic ligatures, and no inconvenience at all arises. The tissues should be well grasped with the instrument, so as to avoid lacerations, and when lambing time approaches, the ewes must be kept on flat fields, and the skewers removed.

"*Inflammation of the Udder.*—This disease is known in different parts by a variety of names which we need not mention here, as they are far from satisfactory, or even proper. The healthiest ewes are often subject to it, and under peculiar circumstances. Most cases of inflammation of the udder are seen when there is most mortality amongst the lambs, and the ewes have no young ones to nurse. If turned out in a very bare pasture, and not much cared for, they do well; but if the shepherd, in his own anxiety to do good, milks the ewes and attempts any artificial plan of drying them, accidents are common. The explanation of this is simple. The act of drawing off the milk encourages the secretion of more; blood is thus determined to the udder, and unless the milking is carried on regularly, which would keep the ewes in full milk, congestion and inflammation of the udder result. Whenever possible, ewes should have a dose of physic, followed by the administration of iron in a little food, so as to check safely and promptly the action of the mammæ. It must not be forgotten, however, that starvation is the most readily adopted method to prevent injury to a ewe that has lost her offspring.

"*Eruptions on the Udder, and sore Teats.*—We have been consulted concerning eruptions which have been very troublesome and common on some fine farms. The lands are rich, and were well limed last year. It was to the lime that the accidents were first attributed, but we find a combination of causes. Thus, gimmers suffer more than old ewes, and it is only the sheep with two lambs that are at all badly affected. It is not the heaviest milkers, but the very reverse, and, of course, the lambs labour more actively and constantly to obtain their supply of food. No doubt, the liming has forced the grasses on and favoured a state of plethora in the stock eminently favourable to any inflammatory affection, but there is not much reason to attribute a very special influence to the lime, but rather to the number of lambs and the peculiarities of the gimmers. The disease is the same as sore breasts in the human female.

"In observing the symptoms of the disease, we noticed that one teat was chiefly affected; that the udder on one side was red and swollen, the teat covered with sores and scabs, and in one instance in which the two lambs could only obtain nourishment by suckling on one side, a deep raw wound, evidently inflicted by the teeth, and deepened by ulceration, existed. On many, a pustular eruption could be noticed on the inside of the thigh.

"The treatment for such a disease consists in bathing the udder with an astringent lotion, keeping the ewes quiet, or perhaps enclosed, and allowing the lambs to suckle occasionally. Oxide of zinc ointment to the teats is an excellent remedy."

Inflammatory Fever.—The following remarks on this, by Mr. T. Bird, in his paper on the management of sheep, in the Highland Society's Transactions, will be valuable:—

"As this is a disease amongst sheep that I have not heard of as having yet become general, it may be as well to say here a few words about it. I have rarely seen it attack any kind of sheep but hoggs on cut, which were feeding unusually fast, during unseasonably mild, sunny, warm weather, and hoggs which had newly lost their fleeces in unseasonably cold weather. So rapidly does it prove fatal, that it is often difficult for the shepherd to prevent those affected with this disease from dying in the blood. The flock may seem all well, and within a very few hours after one of its number be found lying dead, almost in the natural position as when resting, with a little bloody froth about the mouth and nostrils. Such has even occurred through the day, with a man waiting upon them. On skinning those that have thus died, spots, or it may be whole quarters, are to be found in a gangrenous condition; an effusion of black blood, intermixed with small bladders of gas, having taken place in the *facia,* betwixt the skin and the flesh. When it has cut off one of a flock, a few more may assuredly be expected to follow, unless preventive measures are at once adopted; the most effectual of which will be found to be, a run off to grass, and fewer turnips given for a time. At such a crisis, supplying them with rock salt may have—indeed, I almost believe from what I have witnessed, has a beneficial effect, without lessening the turnips or running off to grass. But still I would strenuously advocate in this, as in the generality of diseases affecting sheep, a change, as the safest, surest, and most simple of all preventives. Change of situation, change of field, change of food—in short, change of any kind that may be and is within the reach of any sheep farmer, together with keeping them always in a steadily progressive, healthy, improving condition, and not half-starving them one day, week, or month, and over-feeding the next, are, I feel convinced, not only the surest means of prevention of disease among sheep that can be used, but also much the most profitable method as to the feeding of them, believing, as I do, that variety as well as quantity and quality of food has much to do with the celerity of their fattening and increase of weight."

The concluding remarks of Mr. Bird as to the value of change in the above, we consider of special value; and to another remark of the same authority in another part of his valuable paper, we also draw special attention, and with it fittingly conclude our present chapter :—

"The real and important question is not so much as to how many of the diseases affecting sheep are to be cured, as to how they are to be prevented."

CHAPTER III.

DISEASES OF THE HORSE.

"THE following remarks on the diseases, symptoms, and simple treatment of the *horse* are merely intended as a plain practical help or guide to the owners of this valuable animal, in the absence of the regular veterinary attendant; and in order that it may be so, all professional technicalities or elaborate details are avoided. We shall commence by premising that, 'in a state of nature, animals can hardly be viewed as subject to disease—the open air in which to breathe, the simple herb their repast, the pure stream their drink, neither care nor passion disturbs their sleep or inflames their rest.'* Now, we know that when a young animal is first placed in the stable in order to become domesticated, he is in a great measure excluded from these grand exponents of health; in the first place he is taken from the pure air to a close, perhaps foul stable—or it may be, for a few hours, to be bitted or lunged, then to be turned out again wild and feverish from excitement. No wonder, then, that the respiratory organs become affected. Again, by the change from the pure succulent herb to highly stimulating artificial food, the digestive organs become disordered, the result of which, in the first instance, is disease of the larynx and adjoining glands, especially between the jaws, termed *strangles;* in the latter instance constipation, or scouring. Again, take the case of the nag or cart colt, fresh from the farmer's hands to the dealers', all the time undergoing very different kinds of treatment in air, exercise, and feeding; no wonder that again we meet with disease as above, but this time it is called the influenza. No wonder, then, that from so many domestic changes, the respiratory organs are at all times so susceptible of disease when the seed is sown so early.

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* Perceval.

"*Strangles* commence with a kind of low, weak, slow fever; the animal hangs his head heavily on the manger; eyes swollen and watery; glands swelling under the jaw and sides of the throat; little or no appetite; slavering from the mouth; coat staring, pulse weak and slow, at times quickened, but soft to the feel; severe cough, difficulty in swallowing and breathing. At this stage the larynx and pharynx are both involved, and the poor animal's sufferings are truly deplorable, there being an inclination to eat or drink, but from the state of the parts complete impossibility in masticating or swallowing. Treatment: In the early stage, when the tumours are forming, the best and surest practice is at once to well rub in a strong blister on each side of the throat, and especially between the jaws, so as either to repel or bring forward the tumours or abscess, that it may soon break or discharge; and when once opened, insert a little tow smeared with the digestive ointment. In some cases the swelling from the roots of the ears down between the jaws remains hard, and seems to defy all blistering, poultices, or fomentations, to bring to a head at any part; the animal will scarcely allow the insertion of the fingers in the mouth from the inability to move the jaws consequent from the swelling and tenderness of the parts internally and externally. In such cases great patience is required, for treatment seems to be of no avail, and the first favourable symptom will be a profuse discharge from the nostrils, showing the parts have broken inwardly. On the same taking place outwardly, in the early stage, when the appetite is not much impaired, and the animal is able to swallow, the following powder given once or twice a day, dissolved and mixed in the bran mash, or in gruel—

Powdered nitre	2 drachms
Tartar emetic . .	½ to 1 drachm—

will be beneficial in allaying the fever; the diet should consist of bran mashes, sloppy made, gruel, hay tea, boiled linseed, placed in a bucket and hung in the manger, so that he may take a mouthful at any time. When the animal can masticate, green food if it can be obtained should be given, or if not, boiled oats and beans mixed in the mash, and in addition a Swede turnip sliced down and boiled, or a carrot sliced; if the appetite is still indifferent, and the animal can swallow easily, you may give the following stimulant as a bolus:—

Pulv. carb. ammon. . . .	3 to 4 drachms.
„ gentian	2 „ 4 „

Molasses q.s. fiat. bol.

When discharge from the nostrils takes place it should be encouraged by steaming, fomenting; and if outwardly, fomenting, so as to keep the parts clean, and apply some digestive ointment, as before mentioned. When the animal begins to gather strength, if the weather and the season permit, turn him out for an hour or two; if not, let him gently walk out for a little in the pure air, as a good restorative, taking care to clothe according to the weather.

"Animals in the spring and fall of the year when shedding their coats, which has a weakening influence upon them, more or less, according to the manner or system on which they are kept, and during the prevalence of north-east winds with wet weather about such times, are rendered very liable to *catarrhs* or *colds, sore throats, influenzas, distempers,* &c. &c., and which may all be classed as the same disease, only that they differ in the urgency of the symptoms and extent of the parts involved. For instance, take a case in point—catarrh, or cold with slight sore throat, swelling of the glands, cough, appetite but little impaired, coat looking unthrifty, watery discharge from the eyes and nostrils; all that is required is the application of a mustard cataplasm to the throat, and well rubbed in; a few days' rest; and give night and morning one of the following powders mixed in a bran mash:—Powdered nitre, 1½ to 3 ounces; tartar emetic, 6½ to 12 drachms, mix and divide in six powders. Diet: chilled water, bran mash with scalded oats, or green food if seasonable; or

Pulv. ant. tart.	6 to 12 drachms.
„ potass. nit.	1 „ 3 ounces.

Mix. et div. 6 pulvis.

"*Laryngitis, or Inflammation of the Throat.*—The symptoms are very similar to the last, only that they are more acute and painful, glands more swelled, cough more severe, little or no appetite. In this case, instead of the mustard, well rub in some blister ointment, give the above powders, *increased dose,* steaming the nostrils; diet as above.

"*Pharyngitis,* or *inflammation of the pharynx,* is generally the accompaniment of long or protracted sore throat, or inflammation of the larynx; a sure symptom of which is shown in the act of swallowing —when the animal attempts to drink or take anything, portions return by the nostrils, similar to what takes place if the animal was choked. Look at ourselves, with simple sore throat, cough, hoarseness: it does not interfere so much with the act of swallowing; but when the pharynx becomes involved, then is the difficulty in swallowing solids or liquids, especially the former. Hence the necessity for giving medicine in the form of powder instead of bolus; although we never witnessed any, yet we have heard of serious results happening from endeavouring to force boluses down in such cases. However, the amateur will not go far wrong, in the first instance, in cases of strangles, by applying a blister at once, giving the powders, with bran mash, green food, or else boiled food; but in such cases it is something like the old adage, 'one man may lead a horse to the water, but twenty cannot make him drink;' so in this case the animal may be willing, but cannot. Steam the head, by pouring scalding water on a little hay placed in a bucket, and allow the animal to inhale the steam by placing it under the nostrils. Poultices in such cases we consider of no benefit, as it is impossible to keep them close to the parts, and they greatly incommode the poor animal.

"*Simple Sore Throat.*—Apply the mustard, as before stated, or rub a little of a liniment, as this—olive oil, spirit of terpentine, spirit of hartshorn, of each equal parts—and giving the powders. In the latter and more severe and complicated stages, promptly apply a blister, giving the powders, regulating the dose according to the age and size of your patient, steaming the head, well clothing the body, bandaging the legs, but allowing plenty of pure air. In such cases, where great debility exists at the commencement of the disease, or when the disease has reached that stage when it is called influenza, or distemper, and when the head, legs, sheath, belly, &c., are much swollen, with profuse discharge from the nostrils, there is no better practice (at least, we have always found it so, although it seems contradictory and untenable with disease of an inflammatory tendency) than to give a tonic or stimulating bolus in the morning, and a nauseant or sedative* at night—that is, if it can be easily given ; and, luckily, in such cases, it is very seldom the pharynx is much involved, so that the act of swallowing is easily performed. Such cases require a great deal of patience and nursing, and more especially in the winter season, especially if metastisis takes place, that is, a shifting from one part to another. For instance, one leg will become enormously swelled in a few days; that will be reduced, then the next is attacked ; then, again, the head, eyes, and tongue. We have seen the latter hanging out of the mouth hard and

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* TONIC OR STIMULANT.

Sulphate of iron	2 drachms.
Gum camphor	2 „
Pulv. gentian	3 „

Or, for a change, at times omit the sulphate of iron, and give carb. ammonia 4 drachms.

NAUSEANT OR SEDATIVE.

Gum camphor	2 drachms.
Pulv. nitre	4 „
„ tart. emetic	2 „
„ digitalis	½ to 1 drachm.

Treacle as much as will mix to make bolus.

swollen, mouth open, appearing too small to hold it, and the stench from which has been sickening. In such cases the tongue must be well scarified, and well fomented with warm water, in which a little chloride of lime is dissolved; and as in such a case the animal is neither able to eat or drink, you must then horn down plenty of gruel, adding some port wine, or good stout, &c. We have seen a poor animal follow us round the stable to get the bottle to his mouth, when he would suck away till empty, and then whinny for more; and to assist the poor animal to eat, you must push with the hand the food well up amongst his grinders. Such cases try the skill and patience of the best practitioner.

"These are but hints on the foregoing diseases, but they are such that the owners of horses will not go far astray in following. At the same time we may remark, that in the early stages of severe catarrh, &c., and in which the pulse is accelerated, with considerable heat in the mouth, perhaps a slight heaving at the flanks, we would advise bleeding to the extent of 4, 6, to 8 quarts, according to the age, size, or urgency of the symptoms; but, mark! if discharge has taken place from the nostrils, you must on no account draw blood without the sanction of your veterinary attendant. In the generality of these cases, if early looked to, bleeding, with the other remedies, arrests the further progress of the disease, and especially when these diseases are epidemical; but, we are sorry to say, in practice such cases are neglected too long for bleeding to be had recourse to; the disease may then have taken on the putrid typhoid type. Hence the blow-hot-and-cold treatment already recommended. Sometimes the inflammation will extend along the trachea or windpipe, involving the bronchial tubes, or small ramifications of the windpipe, in and through the substance of the lungs. In such cases it is then termed *bronchitis*, or inflammation of the bronchia. Blood-letting is here called for, and may be to a large extent required, with blisters along the windpipe, front and sides of the chest, consisting of mustard made with boiling vinegar; or the blistering ointment. We have generally found the mustard sufficient, giving the sedative boluses as before mentioned. At the same time the inflammation may extend to the parenchyma, or substance of the lungs, and even attack the pleura, or membrane lining the chest. This complication generally proves fatal; still these diseases may exist of themselves. The symptoms to be most easily detected are—in *bronchitis* a hard, dry sort of half cough, if we can so term it; by placing the ear to the windpipe you will detect a sort of gurgling rattle; the appetite is impaired, legs and ears sometimes hot, again cold, mouth hottish, pain felt on pressing the throat, pulse accelerated, very little discharge from the nostrils, rarely lying down. Treatment: Bleeding, blistering, sedatives, and nauseants. Diet as already mentioned.

"In *pneumonia*, or inflammation of the lungs, the animal will be found with neck and head extended, muzzle nearly resting on the ground, and pawing the litter; in the early stages as if griped; excessive action of nostrils and flanks; eyes blood-shot, cold sweats, looking anxiously from time to time sideways; sometimes cough is present, but generally slight; pulse much accelerated, hard, so small as hardly to be felt; legs and ears cold, breath very hot; never lying down. Treatment must be prompt and active, and bleeding is the sheet-anchor here; blistering, sedatives, and nauseants, as the following bolus four to six times a day, omitting the aloes after 2 or 4 drachms have been given, continuing until the acute symptoms somewhat abate; then give twice a day for a few days longer, the veratri, or hellebore, half a drachm, but we think that is best left alone in using by the unprofessional; allowing plenty of pure air, bandaging the legs, and well clothing :—

Barb. aloe	1 drachm.
Gum camph.	1 ,,
Tart. antim.	1 ,,
Pulv. digit.	1 ,,
,, potass. nitrat.	2 drachms.

"In *pleurisy* the pain seems to be terribly acute, and the above symptoms fearfully increased ; hot and cold sweats, and pressing the thumb between the ribs causes excessive pain. Bleeding here, again, is the sheet-anchor, being guided by the pulse. Pulse in these inflammatory diseases is rapid, very indistinct, not easily felt, being small and hard ; so long as it continues thus, it indicates more bleeding being required ; when it becomes more distinct, being fuller, softer, not so quick, you may then depend on the medicine for still reducing the circulation or continuance of the inflammation ; but should the pulse again return to its hard, small, quick state, with increased breathing, bleed again. In debility, the pulse small but soft, slow, lingering-like under the finger ; the breathing may be increased, but is weak, slow, half-kind, dull, not the exciting kind as in the other.

"Treatment : Blistering, &c. &c., continuing the boluses as in pneumonia. A capital counter irritant in such cases is, applying a horse-rug or blanket soaked in scalding water, being held by two men under and up the sides of the chest, and when held in that position, pour the hot water on the blanket as hot as the animal can bear it, repeating frequently.

"*Congestive Pneumonia.*—Symptoms : A horse in full condition, and in apparent health, has been confined to the stable for some days, and is all at once put to fast and long-continued work. Before the end of his journey, or work, he is found to flag, and after being a short time in the stable, commences to pant most severely for want of breath, heaving at the flanks, nostrils distended, head hanging heavy in the manger, cold sweat, mouth cold and clammy, legs and ears cold, eyes to all appearance ready to burst out of the head, no pulse can be felt. We have met with many of these cases in posting establishments, and on farms as well. Bleeding here, again, is the sheet-anchor, but the blood is so thick it will scarcely flow, and is as black as coal-tar. In such cases it is very tedious to get sufficient blood withdrawn. After you have, perhaps, got a quart or so, he begins to stagger; take away the bucket, close the wound with the finger and thumb for a minute, and try on again and again in the same manner until you have got so much blood that the breathing is relieved, and you can begin to feel the pulse; then well rub in plenty of mustard made with boiling vinegar all up the sides and front of chest, and well up the course of the windpipe as well, and give one of the boluses, as in pneumonia, every three or four hours; for, if the above kind of pneumonia, acute inflammation is apt to supervene, likewise pleurisy. We have often in such cases given a bolus, consisting only of 4 drachms of carbonate ammonia, mixed in treacle (the action, &c., of which we need not here inquire into), when the blood would only drop, it being so thick; still the amateur had best not use the stimulant: but again, in fact, before he can send a few miles for the 'Vet.' the animal may be dead, or beyond cure, from the inability of getting the blood to flow, so that he cannot err or run much risk by bleeding. The grand point is to get sufficient blood to relieve the over-gorged blood-vessels, keeping in mind the directions before given for doing so. Such cases are often met with, also, in the hunting-field. When such do happen, get the animal to the nearest farm-house, and follow the directions, as before. In this case there is not so much to be dreaded in giving the stimulant as in the manner of giving: *never drench* or *attempt it;* from the violent efforts to breathe during giving the drink, the animal will not cough, and some will escape into the windpipe, and then we defy all efforts to terminate the case favourably.

"We need not refer to hydro-thorax, or effusion in the chest, too often a termination of the foregoing diseases—for, we are sorry to say, in such cases the most skilful treatment is but of little avail. Taking 'time by the forelock' is the only means of preventing those dreaded terminations of such acute diseases. If much debility is present after any such attacks as those stated, tonics and diuretics are the best means of preventing effusion; but the treatment requiring great nicety, skill, and practical knowledge, we need not refer to it here.

"We will now proceed to a few simple remarks on the diseases of the abdominal contents, the most frequent of which are: *Spasmodic colic, i.e.* gripes, belly-ache, bots, &c. *Enteritis*, *i.e.* inflammation of the bowels. (Spasmodic colic, strictly speaking, is a stricture or contraction of some portion of the bowels; but may arise from many causes—drinking cold water when hot, and more readily after being kept from it too long.) *Constipation*, from beans or peas (more especially if new, and where the animal has not been partaking of them for some time), and clover grass. *Concretions, i.e.* dust balls, gut-tie, or strangulated bowels, &c. An attack of pure simple colic is very sudden; the animal may be at plough, or on the road, when all at once he will suddenly stop, scrape or paw with his fore-feet, try to lie down, or suddenly throw himself down; get up, perhaps give himself a shake, and go on as if nothing was the matter, till another spasm, or pain, or gripe, seizes him. After such repeated attacks, perspiration from pain will be coming on, and when placed in the stable he will again throw himself suddenly down, roll over, get up, scrape or paw, stamp with hind-feet up towards the belly, continually turning round; laborious breathing, and, perhaps, tympany, or swelling of the belly, present; if the pain continues, the animal will be in a violent state of perspiration. In the early stages, and when the pains only occur at intervals, the pulse is but little affected from its natural state—perhaps a little quicker; but as the disease continues, it is almost an impossibility to get at the exact state of the pulse, so you must be guided by the continued pain, without any intervals of ease, as to the inflammation taking place, or to what extent inflammation is present: the continual getting up and lying down, rolling, sweating, until relief or death takes place; one sure symptom of the latter is, the animal sitting on his haunches like a dog, indicating strangulation or gut-tie. We have also seen the same symptoms, with a heavy boring or pressing of the head and chest forward, where rupture of the diaphragm had taken place, with a portion of the bowels lodged in the chest. That boring and pressing of the head and chest is also present when rupture of the stomach has taken place. Where the above symptoms are present you may safely prognosticate what is the matter, as it will be found in the *post-mortem* examination. Inflammation of the bowels, as well as the above unremedial diseases, are all ushered in at first by symptoms of severe colic or belly-ache—at least all the cases we have seen, and they have not been few. Retention or stoppage of urine is generally shown by symptoms of colic, with this exception in the early stage—say, the animal is at work, he seems duller, breathes quicker and harder, sweats with little exertion, draws the penis, or yard, endeavouring to stale, but cannot—perhaps he may stale a very small quantity. This may continue the greater part of the day, and when placed in the stable he will neither eat nor drink, or may only take a mouthful or so; will hang his head on or under the manger, scrapes with his feet, wants to lie down, but at the same time seems disinclined to do so; if he does lie down, lies rather quiet; mouth, legs, and ears, natural heat; quick breathing, increased action of flanks and nostrils, cold sweat, trying to stale at times. By placing the ear to the sides of the chest or windpipe, from the increased action one would suspect pneumonia was present; but then you will find the pulse but little or in no way affected. Mark! we are now speaking of stoppage of urine in the early stage; if no relief is soon afforded, after a time the symptoms will become as violent as in colic, and quite as similar; the treatment of all these cases symptoms resembling that for spasms. Colic, treatment as before mentioned in the early stages of simple colic. For stoppage of urine, give the following draught:—

ANTI-SPASMODIC DRAUGHT.

Ol. lini.	1 pint.
Spt. tereb.	2 to 3 ounces.
Tinct. opii	1 „ 2 „

Mix.

Or, Black pepper	2 or 3 ounces.
Ground ginger	½ to 1 ounce
Gin (Holland)	½ pint.
Ale, warmed	1 pint.

There is no end of recipes for gripes. &c., but in all cases the above, we think, will be found sufficient for pure cases of spasms, stoppage of water, &c. We have always found the following sufficient : linseed oil 1 pint, spirits of terpentine 2 to 3 oz., tincture of opium (*i.e.* laudanum) 1 to 2 oz. ; or, if that is not handy, some black pepper, mixed in some gin and warm ale.

"Should *constipation* be present, and the pains still continue for about an hour after the first medicine is given, give Barbadoes aloes 4 to 6 or 8 drachms, powdered; carbonate of ammonia, ½ to 1 oz. ; dissolved or mixed in about a pint of cold water. But after the first draught is given, well wash the sheath and penis by gently drawing it out with warm water and soap; throw up plenty of clysters (*i.e.* injections). If the pains should still continue, and the pulse increase in force and frequency, bleed, and take away as much as the animal will bear. Now, we would advise, in all cases when the pains are very severe at the first, not to hesitate to bleed, and largely ; it can do no harm, and by delaying too long, perhaps cause fatal injury. We have heard of professionals who generally say, 'Oh, we never bleed in such cases!' All such, we say, in our humble opinion, is foolishness ; such cases, simple at first as they may appear, having so much tendency to run quickly to inflammation. Again, should there be chronic disease, less or more, of the lungs (and show us the horse exempt from that after six or seven years of age, although not, perhaps, perceivable while living), what so likely to produce acute inflammation in these organs as the violent excitement existing during a fit of colic or spasms? We are not advocates for a free use of the fleam in all and every case; however, the farmer, &c., in such cases can never be far wrong; and should he have no remedies at hand suitable, he can never err in bleeding as early as possible. Should the pains still continue, he should then apply a mustard blister, well rubbed in all along the belly, to which may be added a little ammonia or turpentine, with bags or blankets dipped in scalding water, and held by two men, one at each side, up to the belly; injections, repeated bleedings, and occasional drenches of gruel, in which you may give an opiate,* such as extract of belladonna 2 to 4 drachms, acetated liquor of ammonia 2 to 4 oz. The above is a course of treatment to be employed in such cases; and the earlier, even in a simple form, the better. Active measures at the outset are the best, safest, and surest policy to follow; for, as we have just hinted, you may have disease going on in the chest as well as in the abdomen.

"Over-gorging or loading the stomach and bowels with dry indigestible food, or even with clover grass, &c., is often the cause of these diseases. In this case the same treatment must be used—bleeding, purgatives, stimulants, &c.; injections, counter irritation, as before stated, &c.

"Sometimes these diseases will suddenly change to the fore-feet, causing acute inflammation, or *founder* of the feet, as it is termed. This will require the utmost practical skill, so we need not enlarge on the treatment here, further than removing the shoes, thinly paring the feet, bleeding at the toe, poulticing, blistering, or firing and blistering round the top of the hoof, paying attention to the state of the bowels, but not giving strong purgative doses; rather try mashes, gruel, giving sedative and diuretic boluses. Superpurgation may arise from the same cause, and produce colicky pains; in this case you cannot do better than bleed—say, six quarts—and give the anti-spasmodic draught, nursing the bowels, as it were, with mashes, gruel. In such cases it neither does all at once to stop it by astringents, or to carry it off by purging. We might say, take a middle course betwixt the two; and by all means have the shoes taken off, the feet pared, and the animal placed in a loose box in case of metastisis taking place, that is, the disease changing from the bowels to the feet, as before stated. Should an astringent be imperatively required (as would be the case in giving an over-dose of purging medicine), one of the following will suffice:—

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* "Ext. bellad. . . . 2 to 4 drachms.
Liq. ammon. acet. . . . 2 „ 4 ounces.
Dissolve the Ext. in some boiling water, and mix, repeating as necessary.

Prepared chalk	2 to 4 drachms.
Extract catechu	1 ,, 2 ,,
Powdered opium	1 ,, 2 ,,
,, ginger	4 ,,

Mix in treacle, and make into bolus.

Or take half a pound of starch, make into gruel, and mix—

Tincture opium	1 to 2 ounces.
Powdered ginger	½ ,, 1 ounce.

In over-purgation from eating clover grass, you cannot do better than give the anti-spasmodic draught (*see* p. 172), giving the largest dose of tincture of opium. After it is allayed, you can then judge of the necessity for giving any further purging medicine.

"Severe *constipation* may also be the result of overeating dry food, and may, at intervals, cause colicky pains. Purgatives here at once, clysters, plenty of gruel, sloppy mashes, stimulants, if necessary, but no opiate (see recipe, p. 174, *note*); and if colicky pains increase, then anti-spasmodic draught recipe, p. 172, omitting tincture of opium.

"The foregoing are simple observations or hints on the diseases of stomach and bowels, and an early attention being paid to them in all cases in the early stages, will be the means of preventing the many fatal consequences which may take place by delaying too long prompt active treatment, simple as the symptoms of the disease may appear to be.

"Before leaving this subject, we may here remark that *bots* is a frequent cause of disease in the stomach. We have seen, after death, the pyloric, opening into the intestine, completely choked up with them, and which defied the strongest purgatives and stimulants to remove; and in some cases the coats of the stomach, to which they were adhering in large quantities, nearly perforated. The symptoms of the above were similar to colicky pains, recurring at intervals, but not so violent. The animal at times very dull, head heavy, walking round and round the box, and seemingly unconscious of all around, and if awakened from his lethargy, gets vicious. These cases generally occurred in the summer time, about the time these parasites are naturally dislodged, or about to come away—a very interesting subject, and one which need not be enlarged on here. We should advise that when horses, about the end of spring and beginning of summer, appear dull, the coat unthrifty-looking, appetite impaired, and if out at grass, tympany, or swelling of the belly occasionally, twitchings of the tail, droppings sometimes softish, next time hard, with perhaps a slight occasional fit, if we may so call it, of coughing, that the animal should be taken up, placed in a cool loose box, and after proper preparation—consisting of a few bran mashes, chilled water—a gentle dose of physic should be given. When worms of any kind are present, after fasting the animal say from morning to night, give 2 oz. of spirits of turpentine, ½ pint of linseed oil, and a gentle dose of physic next morning. There are many other medicines extolled, as vermifuges; but we have found the above always suitable; 'but it's one thing to administer a poison to kill them, another to get them to take it.'

"The *liver* is sometimes the seat of disease, more generally of the chronic stage, and congested. The symptoms of the former are not very pointed. The animal is dull, coat staring, hard, dry, crispy-like feel when taken by the fingers; little or no appetite, or irregular; pulse quick, but full, strong; hardly ever lies down for long at a time; looks round at the right or off flank, and if pressed on that side towards the end of the ribs, feels pain; abdomen full, as if tympany. A sure symptom is lameness of the right or off leg, although no heat or swelling or even pain is felt in examination. In some cases we have seen a shivering of the shoulder, droppings hard, small balls of a dark white clayey-like colour, and covered with streaky slimy mucus; yellowness of the eyes, mouth hot and clammy.

Treatment:—Bleeding; physic, full dose; apply a blister, or mustard well rubbed in on the side where the pain is felt on pressure. After the bowels are well opened, and the physic almost set, you may give calomel ½ a drachm, powdered opium ½ a drachm, gentian or ginger 4 drachms, daily for a few days; and if the appetite is faulty, give tonics, and an occasional diuretic, keeping the bowels open by mashes, carrots, turnips, &c.; or if the bowels should again become costive, give aloes 4 drachms, calomel ½ a drachm. In this case omit opium. When in a congested state, the pain is more acute, and uneasiness more expressed, with the foregoing symptoms; and the breathing is in this case more accelerated, with heavy hanging of the head, eyes staring, bold, full; in the other more sunken. Here you must *bleed,* and *largely,* and this may have to be repeated. Physic, a full dose, in which you may add ½ a drachm of calomel; but somehow we like to leave the administration of the calomel as given before. Blister as before, and when all irritation is allayed, the eyes natural colour, bowels open and droppings more healthy, give tonics and diuretics.

"When treating on the diseases of the bowels, we omitted to mention the peritoneum, or lining membrane of the abdomen. Unless from wounds, we cannot say we ever met with a pure case of *peritonitis.* It is often an accompaniment of inflammation of the bowels, and the symptoms are so much alike, that one can hardly describe any marked difference, unless where the slightest pressure on the abdomen with the hand gives intense pain. The bowels are very much constipated, and large doses of physic are required; in addition to the usual bolus of aloes, give 10 to 15 drops of croton oil, counter irritation to the belly, and bleeding largely; injections. Take for instance this case: a light cart mare, in jumping out of the field in which she was grazing, staked herself between the udder and flank. The wound was about four inches long, and through it protruded the whole—or nearly—of the omentum, or cawl, till it reached the ground. As there was no probability of returning it, we cut it off close to the wound, inserted the small portion left, and stitched up the wound. As it was some three or four hours after the accident ere we saw her, there was then considerable fever, pulse quick, breathing much accelerated, wild look in the eyes, pawing with the fore feet, hard work to keep her from lying down, when no doubt she would have rolled as in colic, &c. After closing the wound we gave full dose of physic, and bled until she began to stagger; backraked, and threw up injections; set two men to foment continually, till further orders, with water as hot as possible. In about six hours after, the fever and uneasiness and quick pulse continuing, bled again to the amount of six quarts, and gave a sedative bolus in which was 4 drachms of aloes and 10 drops of croton oil. Our reason for giving so much purging medicine so close on the first, was a dread of constipation. Next day fever and uneasiness were somewhat abated, pulse rather quick, but natural. As no fæces had been discharged, backraked, and threw up injections. As no urine had been seen discharged, we inserted a piece of ONION * in the vagina or shape, when after a little she camped herself, and discharged a considerable quantity of urine. Gave a sedative bolus, and left one, in which was 2 drachms of aloes, to be given at night. Next day, little or no swelling at the wound, pulse quieter, symptoms altogether favourable. Next day bowels and kidneys had acted, going on favourably, with the exception of near hind-leg, same side as the wound, being very much swollen. Inserted rowel inside the thigh, and fomented leg; wound looking well. Gave sedative; next day bowels again costive, kidneys acted but sparingly. Repeated treatment as on second day. The diet was restricted to bran mashes and gruel. The same

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* "We may here mention that nothing sooner causes a mare to *camp* herself and stale than a piece of *peeled onion* or *chewed ginger* inserted in the vagina or shape, to the depth of two inches or so; and nothing sooner a horse then washing the sheath and penis, or yard, by gently drawing it out; at the same time not forgetting the aid of medicine.

course of treatment was occasionally continued off and on, and at the end of three weeks she was at gentle work. The wound we left to nature, merely keeping it clean, and it gave but little trouble to what we had expected. But mark us,—it is not every case of the kind that will terminate so favourably. We consider that the bleeding so largely at the outset prevented acute inflammation from taking place.

"Kidneys are not often subject to disease, but inflammation is apt to take place from injury, such as blows, leaping in hunting, &c., or being much exposed in wet weather. The symptoms are, if very acute, violent pain, pawing, or stamping rather, with the hind-feet, fore-feet as well; lying down, and looking back as if griped. But in this case there is more stiffness, and care in lying down and getting up than in the other; great difficulty in backing or turning; pulse quick, hard, breathing increased; often trying to stale, but cannot, or else but little at a time, stands with his legs wider than usual, back arched, bowels costive, pressure on the loins gives great pain, making him crouch almost to the ground, in some cases takes a little time to get himself straight again.

"Treatment:—Bleed, and largely; physic; mustard poultice, well rubbed in along the loins, or if it can be got, the warm skin just off a sheep laid across the loins, backraking, throwing up injections; when the hand is introduced, per rectum, you can easily ascertain the degree of inflammation from the heat felt, and whether the bladder is full or empty, but the latter will almost always be the case; no diuretics must be given, and nothing used as a blister but the mustard. Animals, when often troubled with a difficulty in staleing, and in doing so suffering pain, the urine being much changed, the sooner they are properly and carefully examined by your veterinary surgeon the better, as we should, in such cases, advise the amateur to attempt no treatment himself further than giving a dose of physic; or if any fever or quick pulse is present, bleed, apply mustard, and restrict the diet in the acute and chronic to bran mashes, gruel, and, above all, well boiled linseed, as much as he can be got to take, mixed with the mash or gruel, or alone, just as you can get him to take it.

"*Urinary calculi, stricture of the neck of the bladder*, &c. &c., must all be left to the most experienced practitioner, as hardly any rules regarding symptoms or treatment could be laid down that the amateur could safely follow, further than what we have stated.

"We will now proceed to *wounds, bruises, open joints*, and will begin with *broken knees*, as it is generally termed. In slight cases the hair is merely rubbed off, with slight abrasion of the skin, and but slight bleeding, perhaps more bruised and swollen. In such a case, with fomentations, poultices, a dose of physic, and a few days' rest, all is again well, with the exception of the hair being off. In this case apply spermaceti ointment, coloured with charcoal; avoid gunpowder, as it stimulates. If deeply cut, it may require a digestive, such as the ointment mentioned when treating of cattle, or the *black oils*,* to get the parts to fill up by granulation; and when getting too high, apply a little powdered sulphate of copper (*i.e.* blue vitriol), then tinct. benzoin, or compound tincture of aloes, with a feather, or 2 drachms sugar of lead, 2 drachms sulphate of zinc, dissolved in a pint of water; and when fit for work, to hide the part a little, apply the spermaceti, coloured as before. When the wound is so deep as to open the joint, and allow the synovia or joint oil to run, you may then expect considerable fever. Physic here is imperatively called for, and in some cases, when the symptomatic fever runs high, bleeding may be necessary; well foment or apply a poultice, so as to clean the wound, and allay the inflammation in the part, prior to further treatment. The synovia or joint oil is of a sticky, yellow colour, and when dropping on the leg or foot, congeals, and is then more whitish in appearance, so that you cannot mistake it. The animal must be kept as quiet as possible, head tied up to the rack; in some cases partial slinging may be required. The treatment requires the greatest amount of patience and perseverance, and there is no end to the different remedies named; but as far as our practice is concerned, we have always found the following the safest, as giving the least pain (which is a great thing in treating such cases, when you remember that every time the limb is moved it opens the wound and moves the joint, causing a fresh escape of the oil), and we think the most effectual, at least we have found it so: get a piece of new burnt lime from the kiln, and again place it in a fire till it becomes red hot; take it out, and when cool,* pulverise it finely, and apply it with the finger to the wound till well closed up, and then keep dusting it on the part, taking care not to disturb the first application, keeping on in the same manner *continually* at every fresh *oozing* of the *oil*, till it is completely stopped, which may be from a week to two or three. We should think that we have thus treated hundreds of cases, both in the knee, hock, fetlock, &c., and have always had success. After the parts are healed up and become cool, lameness may exist, with enlargement of the joint, in which case blistering repeatedly with the biniodide of mercury ointment is recommended; or even the application of the hot iron, and then blister. A short run at grass will, if the season permit, be beneficial.

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* "Black Oils, from 'Morton's Pharmacy.'—'Olive oil; spirits of turpentine. Mix, and add oil of vitriol 4 drachms, leaving the cork out of the bottle until all the heat evolved has passed off.' It is a very good digestive, and easier applied than the ointment. Merely dip a feather in the bottle and apply.

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* "We may here state that when the lime is made red hot, as stated, its *caustic* qualities are destroyed, but, on the contrary, its *styptic* qualities are increased.

"There are oftentimes wounds of joints internally from the effects of blows, falls, without any external or open wound; in such cases the inflammation is very acute, with much swelling, heat, and tenderness on and all round the part affected. Treatment:—Physic, fomentations, rest; if about the shoulder or elbow joint, a rowel between the fore-legs; again, if about the hip or stifle joint, a rowel inside the thigh will be found good practice. In a short time, should the surrounding swelling become reduced, and only exist on the part originally bruised, you may then expect matter to be forming within; you may now rub in some blister ointment to hasten that process, and when fluctuation is felt, open it, or perhaps it will be best for the amateur to allow it to burst of itself; above all, do not think of opening it further by inserting the finger, because if synovia or joint oil is discharging with the matter (which you will know, as stated before, by its yellowish, glairy appearance, and sticky feel), in such cases there is more trouble in stopping such discharge, from the parts being so deep seated, and not to be reached; and by endeavouring to be of service by pushing in anything with the idea of plugging up the wound, you only make matters worse. Apply the hydrated lime as before, keeping the animal very quiet, and when the discharge is stopped, treat as simple wounds.

Blows, or kicks, on the shank or metatarsal bones, i.e. leg bones below the knee or hock where no flesh or muscle is, only tendons—*tendinous expansions, theca, or sheaths.*—Such wounds are very frequent in such parts, and in some cases *imperative rest* and *quietness* is called for, as the bone may be cracked or partially fractured. Again, blows or kicks are here very often the cause of a *splint,* as it is termed; in such cases, after the inflammation is allayed, apply daily, or every alternate day, a little of the biniodide of mercury ointment, or, what is perhaps better, well rub in a little, so as at once to blister, tie up the head for a day, and in the course of ten days or a fortnight, if required, repeat again; the same will apply to the hock and hind shank bone. We may as well here remark that the treatment of wounds is also greatly aided by the application of *collodion,* the making of which we need not here enter into, as the amateur would not easily make it, and it can be got prepared at any respectable chemist's. Suffice it here to say, that by attending to the foregoing general remarks on wounds and their treatment, the amateur will not err much.

"We may now give a few hints on *general lameness,* and will first consider what is called *spavin,* a small bony tumour on the inside of the hock, which, when forming, causes considerable pain and lameness. The tumour at first may be hardly perceptible, although the animal may be very lame, but by applying pressure—catching, as it were, the outside of the hock with the four fingers, and pressing the thumb on the lower part of the inside of the hock, at its articulation with the shank bone, or, we may say, smaller shank, or splint bone, *i.e.* metatarsals—much pain will be felt. In this incipient stage we would advise fomentations, poultices, physic, at the same time looking to the make of the shoe ;* perhaps the *outside* heel or calking of which is considerably *higher* than the *inside*, causing so much more pressure on the inside, which sets up inflammation in the ligaments, the product of which is, the cartilage or ligament

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* The following are Colonel Fitzwygram's directions for shoeing horses, which will be useful here :—

"To shoe horses with ordinary feet, we would suggest the following directions to the farrier—

"1st. With your drawing-knife take off from the ground surface of the crust as much as may represent a month's growth. Remember that there is generally a far more rapid growth of horn at the toe than at either the heels or the quarters. More, therefore, will be required to be taken off the toe than off other parts ; in other words, shorten the toe. Be careful to make the heels level. Having lowered the crust to the necessary extent with the knife, smooth it down level with the rasp.

"2nd. Round off the lower edge of the crust with the rasp. Do this carefully and thoroughly. If a sharp edge be left, the crust will be apt to split and chip. The preparation of the foot is now complete. It remains to fit the shoe to the foot.

"3rd. Let the shoe be made with a narrow web (¾-inch), of even width all round, except at the heels (see direction No. 8), flat towards the sole, and concave to the ground.

"4th. Turn up the toe of the shoe on the horn of the anvil. The degree of 'turn-up' must be regulated by what you find necessary in each horse to make the wear nearly even all over the shoe. It will be found in practice that most horses take much about the same degree of 'turn-up.'

"5th. Make five counter-sunk nail holes in each shoe, viz., three on the outside, and two on the inside. Make the anterior hole on each side immediately posterior to the 'turn-up.' Let the second and third holes on the outside divide evenly the remaining space on the heel. Let the second hole on the inside be opposite to the second hole on the outside.

"6th. Let the nail holes be punched coarse, *i.e.*, nearly in the centre of the web, brought out straight through to the other side. This may be done with safety where a good crust has been preserved.

"7th. Fit the shoe accurately to the foot. It must be as large as the full unrasped crust, but no part must project beyond. The shoe must be continued completely round towards the heels, as far as the crust extends.

"8th. The web must be narrowed at the heels, so that its inside edge may cover the line of the bars, and no more.

"9th. Slope off the heels of the shoe in the same direction as the heels of the crust, so as to prevent the possibility of their catching in the hind shoe.

"10th. Select nails that will fit exactly into, and completely fill the nail holes.

"11th. Twist off the clenches as short and stubby as possible, and lay become absorbed, and bony matter is thrown out—hence *bone spavin.* The same remarks will apply to splints on the inside of the knee, and at the same place, if we may

them down flat with the hammer, and let the pincers during this time be firmly pressed against the heads of the nails. The clenches are not to be filed either before or after turning down, nor is a ledge to be made in the crust to receive the clenches. For ordinary hind feet the pattern of shoe in common use is recommended, but with a clip on each side, immediately anterior to the first nail, instead of one only at the toe. This double clip keeps the shoe steadier in its place than the single. The web should be made somewhat wider at the toe than at other parts, in order to allow space for the thorough sloping of its inner edge, as recommended under the head of Over-Reach.

"For reasons which have been already explained, the hind foot does not require to be shortened at the toe like the fore foot; but the other directions given above—namely, as regards lowering the crust, rounding its lower edge, accurate fitting without rasping, punching the nail holes coarse, nailing, and clenching, with the total absence of rasping, paring, opening the heels, cutting away the frog or bars, &c.—apply equally to hind as to fore feet. Six nails—viz., three on each side—are needed for the hind shoe. Without the third nail on the inside, shoes are apt to 'twist' on the feet. The horse is now shod. Nothing more must be done for the sake of what is sometimes called appearance. The best iron only should be used for shoes. Good iron makes a light shoe wear as long as a heavy one of inferior metal."

To the above may be added the following:—

"*Simple Rules on Shoeing.*

"1st. After having taken off the old shoe, shorten the toe, and remove all the dead and loose parts of the hoof. Do not cut the sole or pare the frog, except when the foot has received an injury from a nail or otherwise, when it must be well cut out.

"2nd. Let the shoe be of equal thickness, or rather thinner at the heel. The ground and foot surface should be perfectly level. The shoe should lie light on the heels. Too many nails are objectionable, and these should be kept as far as possible from the heels.

"3rd. For the hind feet there is no objection to calkins, though they are of doubtful benefit. Horses travel better without them. The hind shoes are made thicker at the toes than at the quarters; the nails also can be put closer to the heels without causing inconvenience.

"4th. Side clips should be avoided; they destroy the hoof. The same is the case when the nails are too close together. The feet should never be rasped, as it destroys the enamel of the hoofs, renders them brittle, and causes sandcracks, and consequently lameness.

"5th. Expansion is a fatal error, which has led to many abuses in shoeing, such as paring of the sole and frog, rasping of the hoof, &c.

"The elasticity of the foot, which is, however, very limited, exists only on the upper part of the hoof, principally round the coronet. On the lower part and the toe it is *nil.*"—W. Ernes, M.R.C.V.S. London, in *Veterinarian.*

use the term, as in the hock. Splints in this situation are far more dangerous than at the same place in the hock, because by destroying the proper bending or action of the knee joint, the poor animal is always in danger of coming, or rather falling, down on his knees. You may depend upon it that *splints* and *spavins* are more often caused by the above-mentioned irregular manner of shoeing, more especially in young horses when first put to work, than from the *pace* and irregular macadamised or paved roads, though no doubt that is also a frequent cause. The treatment of both is similar; after the inflammation is subdued (by rest, fomentations, poultices, &c.), which will be ascertained by less heat in the part, less lameness, apply repeated blisters with the biniodide of mercury ointment; or, what is the surest means of causing permanent soundness, apply the hot iron, *i.e.* actual cautery, pretty deep in transverse lines across the part affected, extending considerably above and below the exact part; then blister, or in other words, as the operation is commonly called, fire, and blister.

"*Thorough pin, bog spavin, windgalls,* are inflammation of the small sacs in the neighbourhood of joints, containing the joint-oil or synovia, and are caused by over-exertion, leaping, drawing heavy draughts; the joints becoming sprained, cause the bag or sac to enlarge; hence the name *thorough pin,* when the disease is situated just in the hollow above the hock; *bog spavin* on the hock itself; *windgalls* on the fetlocks. Treatment in these cases same as for spavin, &c., especially in the hock, as the disease is more liable to become troublesome there, or, at least, if severe measures are not resorted to, will greatly enlarge. *Windgalls* is the same disease at the fetlocks. Treatment: cold applications, bandages, rest, blistering, firing, according to the extent of the disease.

"*Navicular disease*, or inflammation of lowest joint of the extremities. The peculiar anatomy or structure of this joint (the physiology of which we need not here enter into) causes it to be very liable to inflammation, from over and oft-repeated exertion, stumbling on round stones, bad shoeing, attended with *corns, i.e.*, bruises in the inside corner of the heel in the fore-foot. We may here observe that this disease is almost confined to the fore-feet, although no doubt cases do occur in the hind-foot, although not to cause the extent of lameness as in the former, and which is more frequently over-looked. We have observed several instances, the lameness in which was more easily got rid of, no doubt because in action more weight is thrown on the fore-feet than on the hind. Symptoms of lameness in this joint: place the fingers in the hollow of the pastern above the frog, and you will find considerable heat, and perhaps detect a small puffy tumour—something of the same feel as a windgall; in fact, in its incipient state, we believe it to be the same disease—inflammation or strain of the bursa mucosa—differently situated; the animal will fence or point his foot forward, or, if both are injured, first one, then the other; considerable heat all round the foot, especially at the heels and coronet, with a wiring in or contracted state of the hoof towards the heels; the frogs are much reduced in size, with more or less discharge of stinking matter, *i.e.* thrush.

"Treatment:—In its early stage, and if arising from corns, bad shoeing, or from travelling a long distance with a stone picked up between the shoe and sole, the shoe or shoes must be taken off, the feet well pared, quarters rasped thin; and to facilitate that by softening, as well as to reduce the inflammation, poultices should be applied, soaking them repeatedly in hot water; of course, not forgetting the usual dose of physic. When the inflammation is reduced, put on the shoes, making them rather broad, concave next the sole, and keeping all pressure from off the heels by rasping them down a little, especially on the inside, bearing in mind to have the nails on the inside placed near the toe, and as far from the heel as possible; next, cloths placed round the pastern, and kept constantly wet with cold water, or the animal tied up, and the feet placed in a bucket or trough made on purpose, filled with cold water, frequently renewing the same. Continue this for some time, removing the shoes, and paring the feet well occasionally; next blister with the biniodide of mercury; after the action of the blister is over, commence with cold water again for some time; then blister, and so on as the case may require. When navicular lameness becomes settled or confirmed, or, as it is generally called, groggy lameness, treatment seems to be of little benefit; great ease may be given by paying particular attention to shoeing, &c., as before directed, and the application of cold water. Further, we may remark concerning contracted feet that a sure cause of this seems hereditary amongst our well and thorough-bred horses; there is no doubt about it, and we dare say it will continue so, for it is seldom a thorough-bred horse is used as a stallion until he is unfit for the turf, from groggy or other lameness. The same may be said of the mare: both *sire* and *dam*, for *breeding*, cannot be too *sound*, both in *wind*, *limb*, and *eyesight*; in our opinion these are more to be looked to than *form*; of course, if you can find all four points in both, so much the better. The operation of Neurotomy is often had recourse to in such cases, and in our own practice we have had many cases which have gone sound, and been useful for years after the operation; but the practical veterinarian must be called in here, as he alone can judge whether the operation will be of benefit or not for any length of time.

"*Ringbone*, or ossification of the lateral cartilages, sometimes extending to and involving both pastern bones, is mostly confined to heavy draught horses, and may often be traced to bad shoeing, or, plainly speaking, oftentimes for want of shoeing—in the first place by making one calking so much higher and stronger than the other, in the second by the one calking getting worn down long before the other, in both instances causing unequal pressure, inflammation, and its consequences. Treatment: firing and blistering, with proper attention to the shoeing.

"*Sandcrack* may arise at any time from a false step, in a good, sound, strong hoof; but some hoofs, from their friable, shelly nature, are more liable to it than the strong, sound hoof. Treatment: fire and blister the part at top of hoofs.

"*Corns*, as we said before, are situated in the inside heel of the fore-foot; cause, bad shoeing. Treatment: pare the bruise thoroughly out; apply buttyr of antimony, or hydrochloric acid (*i.e.* spirit of salt); prevent any pressure from shoe when applied; then introduce some boiling tar on a little tow between shoe and bruised part. The shoe should have a little more cover than when in ordinary shoeing; in fact, at all times the shoe ought to be, as it is termed, full in the web. In hunting and on the turf, that cannot well be done, but in all horses for road work, the shoe ought to be made so as to protect the foot as much as possible, and well concaved or hollowed out next the sole, leaving all the bearing on the outside crust or rim, the nails on the inside being placed as near to the toe as possible, and of an uniform thickness throughout, with the exception of the heels, which are generally thicker than the other; still, they ought to be of the same thickness. Unfortunately, in cases of cutting or brushing, as it is termed, this cannot well be done, but a deal of that might be prevented by paying proper attention to aforesaid remarks. Horses, when leg-wearied, are apt to brush; when this is observed they should have a few days' rest. When cut at the knee, poultice, previously removing the shoe, and ascertaining its level bearing. Some horses, from their awkward way of going, or action, are very troublesome in this respect, and require all the ingenuity of the shoeing smith, more particularly if the veterinary attendant is ignorant of that branch of his profession.

"*Thrush*—a nasty discharge of matter from the cleft of the frog, the effect of moisture, dirt, &c.—when neglected, is apt to become very serious, when it extends, as it will do, all round the foot, and even up the wall to the coronet. Contraction has a great tendency to produce thrush, which, when simply confined to the cleft of the frog, only requires keeping clean, paring away all loose or detached pieces, to prevent the lodgment of dirt. Apply a little buttyr of antimony, well inserted with a strong feather or otherwise; then insert some boiling tar on a little tow, repeating as above every three or four days.

"*Canker or Cancer of the Frog or Foot.*—The diseased parts must be thoroughly exposed, and apply buttyr of antimony; or, what is better, the solution of bichloride of mercury (see foot-rot in cattle); or, what we have been for many years in the habit of using, tar and sulphuric acid, four parts of the former to two of the latter, applying directly when mixed. We consider this almost a specific in such cases, using a leather sole or boot during the treatment.

"In concluding the foregoing hints on the diseases of the horse, however imperfect or short in detail as regards causes, anatomical or physiological descriptions, as the nature of this treatise compels them to be, they may, nevertheless, be found useful to those for whom they are intended, and by following the rules laid down during the progress of the remarks, the amateur will not err far in putting them into practice, until he can have the assistance of the duly qualified practitioner."

The *treatment of stock in the convalescent state* is of immense importance, and on this we have given various notes under the different heads. The subject, however, has been so ably and suggestively treated by Professor Brown, in the *Veterinarian*, that we shall do our readers a service by giving the following from his most valuable paper:—

"After the subsidence of an active disease, the restoration to perfect health commonly proceeds with extraordinary rapidity, the appetite being often excessive, and the assimilative powers proportionately active in such cases; little care in the arrangement of the food is necessary, so that a liberal allowance of nutriment be given. The ordinary provender will be eaten with avidity and with benefit, so that the animal be not allowed to eat to repletion. In other instances the patient advances slowly to the convalescent state, a fastidious appetite and impaired digestion retarding the recovery by preventing the animal eating, or, at any rate, appropriating, the material which the system really requires; the drenching-horn we look upon as a last recourse. In the mean time, the patient's taste may be consulted, and any tempting morsels offered; the admixture of condiments is sometimes the most ready method of provoking appetite and aiding digestion; salt, turmeric, aniseed, and various spices are at different times effective in combination with the ordinary diet.

"One golden rule deserves unceasing repetition, viz., never to leave any food which the animal has refused in his sight or within his reach; and second only to this maxim is another, which insists on scrupulous cleanliness in the hand which touches the provender and the vessel which contains it. Let those who question the necessity for such delicacy observe how the horse and other animals test everything by the sense of smell, and judge how important it is that the extreme sensitiveness of the sick subject should not be outraged by even an offensive odour.

"When extreme debility is present, food must be selected with care, as the digestive function is easily disturbed. The diet for such cases should be tolerably rich in starch and sugar, as deficiency of respiratory material is often more serious than diminution of the muscular structure, hence the value of mixtures containing oil-cake, linseed, potatoes, and in human medicine various forms of farinaceous material or gelatine, which are erroneously called nutritious, but which, although wanting in this respect, are precisely adapted to that condition of system in which they are usually prescribed—a condition marked by a peculiar decrease of the fatty texture and extreme emaciation. The exaggerated statements of the effects of diet mainly constituted of gelatinous principles, such as a preparation of snails or oysters given in the treatment of consumption, owe their existence to the recognised benefits which follow the consumption of food capable of supplying the elements of fat, while the medicinal value of cod-liver oil, naphtha, and other hydrated carbon, may be safely ascribed in great part to the same circumstance.

"No amount of nutriment is of the least use to the organism so long as there is a deficiency of fuel for the respiratory function, as under such conditions healthy assimilation is impossible.

"The development of the muscular system will follow as soon as the animal is sufficiently recovered to take exercise; during the period of absolute inaction we shall in vain try to preserve the integrity of this structure, but no difficulty is found in keeping up the proper quantity of fatty texture, or at least enough to afford an amount of respiratory material equal to the wants of the system, while the patient is yet too prostrate to be exercised with safety.

"A suppurating surface of any extent is usually associated with considerable debility, sometimes with dangerous and even fatal prostration; the healing process may proceed satisfactorily for a time, and suddenly be arrested for a time; a general languor affects the system although the appetite may remain good. The proper dietetics in such instances will include not only nutritious but stimulating food; thus, if the digestion remains active, crushed beans may be allowed, with oats, good hay, and any preparations containing condiments; the therapeutic treatment, at the same time, will principally consist of tonics and cardiac stimulants, the object being to increase the energy of the circulatory and nervous systems, as well as to furnish abundant material for the reparative process.

"Under extreme prostration, digestion is invariably suspended, consequently no advantage can possibly follow the introduction of food into the system at such a time, if we except aliment of the blandest and most soluble kind. The practice of giving a horse an extra proportion of oats, and probably beans, after an extra amount of work has produced absolute exhaustion, is, to say the least, extremely injudicious; the animal would be far better left entirely without, as an alternative, although, as we have stated, a bland soluble diet, as well-cooked gruel, will be beneficial, and will answer all the purposes of a heavy meal, sufficiently stimulating the stomach without occasioning any unpleasant results.

"From the few illustrations we have given, it will be seen how much depends upon the proper arrangement of the daily food. It is not within our province to discuss the principles of feeding, in reference to healthy subjects, but the line of separation between the healthy and the sick is occasionally so lightly defined, that it may be difficult to recognise it at all.

"Many cases of deranged digestion, hardly deserving the name of disease, nevertheless account for emaciation and debility, even in association with a ravenous appetite and a liberal dietary. No delusion is more popular than the one which assumes that plenty of food, and good condition, are in the relation of cause and effect; how often do we find a subject improving upon a fourth part of the food to which he has just previously been accustomed, but which has been of literally no nutritive value, in consequence of derangement, apparently to a very slight extent, of the digestive functions! During inactivity a full diet, as a matter of necessity, leads to plethora, or else deranged secretion and debility; hence, even in health, the food should be carefully proportioned to the actual wants of the system, while during the existence of disease the necessity for such arrangement is increased in proportion to the extent of the disturbance.

"Popular ignorance of the laws which regulate the organism leads to certain fallacies in the arrangement of the dietary; for example—

"The allowance of stimulating food to a patient suffering from an acute disease.

"The use of a highly nutritious and probably indigestible kind of food for an animal prostrated by long-continued or severe exertion.

"The system of supplying an abundance of azotised material, in preference to carbonaceous, in the cure of a debilitated and emaciated subject, whose respiratory function is gradually ceasing for want of fuel.

"A proper appreciation of the principles of dietetics would lead the practitioner to estimate the arrangement of his patient's food as second only in importance to the surgical or medical treatment, and, instead of leaving the matter to the decision of the groom, to insist upon a rigorous adherence to his dietetic system as an essential part of the science of therapeutics."

CHAPTER IV.

DISEASES OF PIGS.

PIGS are not subject to many diseases: the following remarks on the chief of these are given by Professor Tanner in a paper published in the Journal of the Bath and West of England Society:—

"*Inflammation of the Lungs.*—The symptoms are quickened, laboured breathing, frequent cough, and loss of appetite. The pig should be bled, and the following medicine given. To a medium sized pig give—

Calomel	3 grains.
Tartar emetic	4 "
Nitre	20 "

and repeat the dose on two succeeding days; then for a few days give—

Digitalis	2 grains.
Tartar emetic	4 "
Nitre.	20 "

"*Diarrhœa.*—The symptoms are violent purging. In sucking pigs this is often caused by the sow's milk. The simplest remedy for this is to put a moderate sized lump of quick-lime into a pail of water, and of the lime-water thus made, give the sow a pint in her food once or twice a day. When the diarrhœa takes place in older pigs, it is generally an effort of nature to throw off some irritating matter from the intestines. This should therefore be assisted by 2 or 3 oz. of linseed oil; and if it continue after this has acted, give two or three tablespoonfuls of the following mixture:—

Catechu	1½ ounce.
Spirits of wine	1½ ,,
Laudanum	2 ,,
Ground ginger	1 ,,
Water	1 pint.

"*Spasms.*—The symptoms are violent attacks of pain, during which the pig rolls about, with intervals of freedom from pain. As soon as possible after the spasms, give—

Spirits of nitre	4 drachms.
Laudanum	2 ,,

and soon afterwards give three or four ounces of linseed oil."

CHAPTER V.

DISEASES AND TREATMENT OF POULTRY.

POULTRY are subject to many diseases, and much has been written upon their cure. The symptoms are, however, seldom so well marked as to enable the uninitiated to judge precisely of the nature of the disease which may attack the fowls; moreover, from their peculiar habits, and the difficulty of predicating the effect of a given medicine upon them, and, still further, from the fact that a sickly fowl deteriorates in condition at an alarmingly quick rate, we are strongly inclined to recommend the reader to apply his attention to the prevention of diseases, and this mainly by securing dry houses, well aired, and kept thoroughly clean, and by giving good food and clean water. Where disease has fairly set in, so hopeless generally have we found a cure to be, and so much suffering have we found all attempts at it to entail upon the bird, that we are strongly inclined to recommend this as the rule of the poultry yard :—as soon as a fowl is discovered to be fairly ailing, and the disease known, give the curative agency one chance, and if it fails, slaughter the bird without hesitation. You will thus secure a bird in a condition fit for sale or for the table ; but if you delay, its condition in a very few hours will be such as quite to put either the one use or the other out of the question. The following remarks on the diseases of poultry, by Mr. Trotter, taken from his Prize Essay, will be useful here, as showing the importance of preventive measures :—

"*Diseases of Poultry.*—Judging from the many diseases and recipes for the cure of them enumerated in works on poultry, it may be inferred that fowls are very liable to diseases, and that I should enumerate them also ; but mine having suffered very little, I willingly acknowledge my ignorance in the science belonging to the diseases of poultry. I may state that I look upon disease, in a great measure, as unnatural, brought on by artificial living, and without attending to the simple wants of nature. Domestic fowls, in their native land, the climate of which, of many of them, is much warmer than that of these islands, live most in the *open,* and consequently *pure,* air. In consequence of their instincts not being impaired by domestication, they are more cautious in the selection of their food. They drink of the water of the crystal brook. The weak are driven back by the strong. We therefore beg to bring this essay to a conclusion, by adding that beautiful maxim, which ought to be written in letters of gold above the threshold of every dwelling, that 'prevention is better than cure,' and that diseases may be expected amongst the poultry—

"1st. If their houses be damp, cold, unclean, or badly ventilated.

"2nd. If the food they eat do not closely approximate to that which they obtain in nature.

"3rd. If the water they drink be stagnant, the drainage of the manure heaps, &c.

"4th. If the strongest and handsomest be not bred from."

We have culled from what we have elsewhere given, and from other sources, a few notes on the management and diseases of poultry, which may be useful to the reader.

Gapes in Chickens.—"A writer says that he found by accident, that 'dough raised with milk rising is a sure and safe remedy for gapes in chickens, fed while fermenting, but while still sweet.' He has tried it for six years, but says that where he seasons the feed of his chickens with salt, as for cooking, they never have the gapes. Another says—'One of your correspondents recommends the use of turpentine for gapes, applied with a feather in the throat. I have used it for years, but cannot testify to the immediate cure he speaks of; but if persevered in for a few days, it does good. I find it of great use applied externally on the throat, as I think it penetrates to the worm, and possibly stimulates the muscles, tired as they must be by the constant gaping.' After all, the great point is to feed them through it with rich food, such as cream if much exhausted, and to use preventives."

The following is another cure:—

"I have tried the following plan, and found it a certain cure for gapes in chickens. Take a medium sized broom splint; with a sharp knife make two or three barbs near the large end. Open the mouth of the chicken, having its neck drawn straight, and, as the windpipe is opened for breath, put in the instrument, and, running it carefully down the full length of the windpipe, turn it around and draw it up, when one or more small red worms, an inch in length, will be found caught in the barbs. I have taken out four worms at one insertion. Two or three operations are often necessary, but if faithfully performed the remedy is sure."

Roup in Poultry.—"Mix up a dish of scalded bran, with potatoes or bread, not too moist, and a little white pepper, to be given to them at least once a week; this tends to keep the fowls warm, and at the same time acts as an aperient, which is all they require."

Another cure for this disease is the following:—

"I give a pill, night and morning, composed of the following ingredients, viz.:—

Pulv. rhubarb	2½ grains.
„ Peruvian bark . . .	2½ „
„ ginger	2½ „
Sulphate of zinc	$\frac{1}{10}$ grain.

"The heads and nostrils of the fowls must also be washed daily, with a solution made by dissolving one pennyworth of sulphate of zinc in half a pint of water. It is also requisite that the water vessels, &c., should be frequently scalded, and fresh water given every day, and the fowl-house limewashed and kept free from the accumulation of filth; it must also be warm, dry, and well ventilated. The disease is caused by drinking impure water, and generally prevails in wet cold weather; it begins by a discharge from the nostrils, which at first is clear, but afterwards as the disease progresses becomes of a thick opaque character, and the odour is most offensive, and if allowed to get to this stage it is difficult to cure. Mr. Tegetmeier, an authority in the treatment of diseases of poultry, says, that he has known more benefit derived by administering half a grain of sulphate of copper twice a day, in some meal, than from any other mode of treatment. In my opinion, the disease, in its advanced stage, partakes very much of the character of the disease in horses known as glanders; and I have not the least doubt that ulceration of the mucous membrane would be found to exist in one case as well as in the other."

Poultry are very much troubled with lice; to help them in getting rid of these, it is good to let them have a dry dust or ash-heap to roll themselves in. It is interesting to note how eagerly they avail themselves of this "dust bath," and how they seem to revel in it.

Poultry houses floored with beaten or well-rammed clay are said to be less infected with lice than houses which have sandy floors. In this, however, as in other departments of *stock* keeping, cleanliness is, after all, the best preventive: cleanliness of the house and cleanliness of the hens. To secure the latter, let a plentiful supply of pure fresh water be given to them; and a dust-bath should form an essential part of the furniture of a hen-house. A correspondent of a colonial paper suggests that to exterminate lice in fowls, they should be fed for several days on coarse meal wet with water, and sulphur mixed with it; the nests being at the same time thoroughly cleaned, the house fumigated with tobacco, and all the roofs and wood-work whitewashed with fresh lime mixed with sulphur or tobacco.

Lime is an essential element, if not in the food, at least as an adjunct to the food of fowls, or as a medicine. Pieces of slaked lime, old mortar, broken sea-shells calcined, or broken egg-shells, may be distributed here and there in their runs, so that the birds can take of them at leisure. Another very important food is flesh meat; this is a great help to laying; indeed, unless they are supplied with it in the winter months they will not lay satisfactorily; given in judicious quantities, it helps to maintain the birds in good health. To secure a supply of animal food, the French, who are famous poultry fanciers, adopt what they call a "verminer," and which is thus described:—

"Procure a deep crock, into which put some bran, and on it lay a piece of carrion, or other flesh; cover it with a glass cap, so as to admit light, but exclude rain; in a few days it will be a moving mass of living insects or worms, which may be thrown out to your poultry; there is nothing they will devour more greedily, but they should be sparingly given, as the fowls are so fond of them, that if given abundantly it will prevent them taking their usual food. Regularity, when fed by the hand, should always be observed in the hours of feeding, also in the quantity of food given. Do not surfeit them one day and starve them the next, but give the fowls their food as regular as you take your own meals."

Boiled horse-flesh is now given in large quantities by many of the best continental breeders; and is found, as stated above, not only to aid them in their laying, but to maintain them in good health. We conclude by giving an extract from our "Year-Book of Agricultural Facts," which abounds in useful hints as to the treatment of poultry in disease and in health:—

"We should always follow nature in our treatment of poultry ailments, and must therefore, when we have diseases or disorders, endeavour to discover by what deviation from nature, or by what violation of first principles, we have brought trouble on ourselves and suffering on our stock. When wild all animals follow by instinct that course which is best for them, but they are no sooner domesticated, than they seem to lose the faculty of caring for themselves. It is not difficult to understand this. In all birds, save those that nest in trees, walls, ruins, or other places raised from the ground —in fact, in all that are hatched on the level—the young have to search for food almost from the first. Take the young partridge for instance: at four days old it is a forager. This sharpens the intellect, and is not without its influence on the character of the bird. It becomes self-dependent, it cares for its comforts in every way. It learns where food and water are to be had in time of scarcity. It chooses proper roosting-places, and deserts such as are damp, cold, or insecure. But our bird, artificially reared, is provided with food from the day it is hatched; its home, its roost, everything is provided; and in many instances, if it would use a little liberty by choosing a more airy, and hence a more wholesome roosting-place, it is caught when asleep on the perch, and restored to what its owner honestly believes to be a better place. We have been led thus far by the complaint of a correspondent—'Numbers of my birds lose the power of their legs.' A wooden, stone, or brick floor to the poultry-house will cause this. It is cramp, impeded circulation, numbness, weakness, death. Some friends have told us, 'It is very well to tell us we must not have brick or stone floors; but we cannot do without them.' Well, then, keep them; but take care to have them spread over with dry gravel at least four inches deep, and let the surface be frequently renewed, as the sweeping and cleansing will lower it. This will after a time form a hard bottom, keeping away the damp rising from stones or brick which is so injurious to poultry, and which, in all probability, causes the paralysis of which you complain. We have imagined that it does; but you will perhaps tell us you have no poultry-house —your fowls roost where they will. We have had trying weather, especially in the north, and as it requires a great deal of food to keep the body warm in such weather, we should be disposed to think your poultry under-fed. If adult fowls, that can roost where they please, and that have the ordinary necessary shelter always at hand, lose the use of their legs, it is sheer weakness, and can only be overcome by better feeding.

"As a rule, the more severe the weather, the more generous the diet should be. We were much struck, and we hope instructed, by a passage in M'Clintock's narrative of the discovery of the remains of Sir John Franklin's party, in which, after proving that all the gallant men fell down one by one, and died of starvation, he gives the detail of the articles of food found in the boat tenanted by the two last skeletons. Starvation seems an impossibility, but an after remark explains it; the stores found, all excellent in their way, were not good enough to support life in such latitudes. If the natives form a "caché," they fill it with blubber. We are not sure we may not learn something in the management of our poultry from this. We must meet cold with heat. All food contributes heat to the body. It is fuel, then, we must consume—fuel in proportion to the degree of cold that renders it necessary. In plain language, the colder the weather, the better and more plentiful the food should be. That which is more than sufficient in the summer, when the earth teems with vegetation, and insect food may be found under low-boughed trees, among dead leaves, and in every shade, will not keep life in the frame when the surface of the earth is frozen, and no insect or animal can live upon it.

"When cramp begins in a fowl it must be met at once with stimulants, and we know none so good as strong beer. It is good economy to soak meal or stale bread in strong beer, and give it to the fowls in severe weather—chickens can hardly do without it.

"If we are right in our conjecture, that the cramp is caused by the flooring of houses, remove or cover it. If by want of proper feeding, give them bread and ale as soon as you have read this, unless the improved condition of the birds proves they no longer need it."

In concluding the chapters on the diseases of stock, it will be well to draw the attention of the reader to the importance of attending to the first symptoms or indications of coming disease which the animals may exhibit, with a view to taking immediate remedial measures. Prevention is undoubtedly better than cure; but as the evils which afflict the lower animals, in common with humanity, will come, notwithstanding the exercise of the greatest care and the most anxious superintendence, it is the next best thing to do to pay attention to the first symptoms of ailment, and not to treat them as if they were unimportant. At no time is the homely proverb, "a stitch in time saves nine," so worthy of remembrance as when the health of farm stock begins to fail; for the rapidity is surprising with which severe suffering and a dangerous condition follow upon symptoms which may at first appear exceedingly slight. Yet it is noteworthy how indifferent many farmers are to the symptoms of incipient disease in their stock; or if they do take notice of them, it is remarkable how frequently they rest content with merely watching whether the animal will or will not improve, allowing only the unfavourable or alarming result of delay to be the urgent motive to send for the surgeon, or for the use of remedial measures; the probability in too many cases being, that the delay is the cause of a dangerous, costly, or fatal illness, which by careful and immediate treatment may be easily controlled and cured. As soon, therefore, as the symptoms of coming complaints are noticed, let them not be disregarded, but be taken as an urgent motive for doing something quickly and judiciously. It is dangerous for farmers to have the idea that the complaints of cattle are self-curative. Nature will undoubtedly, if left to herself, do much to restore the ailing animal to health, but aided by judicious care she will do more.

4 qts = 1 gallon = 8⅓ [illegible]
2 gallons = 1 peck
4 pecks = 1 bushel = 8 gallons = 77 [illegible]

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